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JOURNAL
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CATALOGUE OF MAMMALIA.

Inhabiting the MALAYAN PENINSULA AND ISLANDS.

*Collected or observed by THEODORE CANTOR, M. D., Bengal
Medical Service.*

☞ Localities printed in Italics signify those from whence the animals of the Catalogue were obtained; in ordinary type those previously given by authors.

QUADRUMANA.

SIMIADÆ.

GEN.—PITHECUS, *Geoffroy.*

PITHECUS SATYRUS, *Geoffroy.*

SYN.—*Simia Satyrus*, Linné.

Simia Agrias, Schreber.

Singe de Wurmb, Audebert.

Papio Wurmbii, Latreille.

Pithecus Satyrus, Desmarest.

Simia Wurmbii, Kuhl.

Orang Pandak, Raffles.

Simia Satyrus,
Simia Abelii,
Simia Wurmbii, } apud Fisher.

- Simia Satyrus, apud Ogilby.
 Satyrus rufus, Lesson.
 Pithecus Satyrus, apud Martin.
 Simia Satyrus, apud Schinz.
 "O'rang U'tan" of the Malays.

HAB.—*Borneo, Sumatra.*

The physiognomy and the colour of the face exhibit a marked difference in living individuals from the two localities.*

GEN.—HYLOBATES, *Illiger.*

HYLOBATES LAR, Ogilby.

SYN.—Grand Gibbon, Buffon.

- Homo Lar, Linné, Mantiss.
 Simia longimana, Schreber.
 Simia longimana, Grand, et Petit Gibbon, Erxleb.
 Simia Lar, Linné Syst.
 Le Gibbon, Audebert.
 Pithecus Lar, Desmarest.
 Simia albimana, Vigors and Horsfield.
 Simia Lar, apud Fischer.
 Hylobates Lar, Lesson, apud Martin.
 Hylobates albimanus, apud Schinz.
 "Ungka étam" of the Malays of the Peninsula.

HAB.—*Malayan Peninsula.*

Siam, Burmah, Tenasserim.

LIGHT-COLOURED VAR.

SYN.—Petit Gibbon, Buffon.

- Simia Lar, β . Linné.
 Pithecus variegatus, Geoff.
 Pithecus variegatus, apud Kuhl.
 Pithecus variegatus, apud Desmarest.
 Hylobates variegatus, Ogilby.
 Hylobates leuciscus, apud Cantor. Ann. and Mag. of Nat. Hist.
 "Ungka puti" and "Wow-wow" of the Malays of the Peninsula.

* An excellent likeness of a young male Bornean Orang Utan, living in my possession upwards of two years, has lately been taken by Mr. Thornam, one of the artists of the scientific expedition on His Danish Majesty's Ship 'Galathea.'

The colour varies from blackish-brown to light-brown, yellowish or dirty-white, sometimes uniform, sometimes mottled. The index and middle toes, of both or of one foot, are in some individuals, of whatever sex or shade of colour, united by a broad web throughout the whole of the first phalanx; in some partially so, and in others not. The ribs vary from twelve (7+5) to thirteen pairs (7+6,) as observed by Mr. Blyth, (Journal Asiatic Society 1841, Vol. X. p. 839.)

HYLOBATES AGILIS, F. Cuvier.

VAR. UNGKA ETAM, Martin.

SYN.—Ungka etam. Raffles.

Oungka, Hylobates Lar, F. Cuv.

Simia Lar, Vigors and Horsfield.

Hylobates Rafflesii, Geoff. apud Ogilby.

Hylobates variegatus, Müller apud Schinz*.

“Ungka etam” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*, (*Malacca, Purlis, Kédah, Púngah.*)
Sumatra.

The first phalanges of the index and middle toe are in some individuals of either sex, partially or entirely united by a web. Sometimes the first phalanx of the middle toe is partially united to the fourth.

An adult male examined, had thirteen pair of ribs (6+7), an adult female fourteen, (7+7), a young male on the left side thirteen (7+6), on the right twelve (7+5). In these three individuals the stomach was constricted at the fundus and the pyloric part, which characters, when compared with specimens of *Hylobates agilis* from Sumatra, will go far to decide the identity of that species and *H. Rafflesii*. On the Malayan Peninsula, the latter appears to be less numerous than *H. Lar*. The light-coloured Var. of *H. agilis* I have not seen.

HYLOBATES LEUCISCUS, Kuhl.

SYN.—“Wou-wou,” Camper.

Simia leucisca, Schreber.

Simia moloch, Audebert.

Pithecus cinereus, Latreille.

Pithecus leuciscus, Geoffroy.

Pithecus leuciscus, apud Desmarest.

* Schinz gives as a synonyme: *Pithecus variegatus*, Geoff. which, however, is *Hylobates Lar*, Var.

Simia leucisca, apud Fisher.

Hylobates leuciscus, apud Ogilby.

Hylobates leuciscus, apud Schinz.*

HAB.—*Borneo*, ?

Java.

GEN.—SEMNOPIITHECUS, *F. Cuv.*

SEMNOPIITHECUS OBSCURUS, Reid.

SYN.—*Simia maura* ? Lin. Lotong, apud Raffles.†

Semnopithecus leucomystax, Temm. in MSS.

Semnopithecus obscurus, apud Martin.

Presbytes obscura, Gray, List of Mamm. B. M.

Semnopithecus sumatranus, Müller, apud Schinz.‡

Semnopithecus halonifer, Cantor, Proceed. Linn. Soc.

“Lótong” or “Lótong étam,” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula, Pinang, Singapore.*

District adjacent to Singapore, in the Malayan Peninsula.

SEMNOPIITHECUS ALBOCINEREUS, Schinz.

SYN.—*Cercopithecus albocinereus*, Desmarest.

Simia albocinerea, Fisher.

Semnopithecus dorsatus, (young) Waterhouse MSS.§ apud

Presbytes cinerea, Gray, List.

[Martin.

Semnopithecus albimanus, Is. Geoff. ?

“Ka-ka” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula.*

* Among the Syn. occurs *Ungka puti*, Raffles, which is *Hylobates agilis*.

† The Hab. Pinang and Singapore, in neither of which islands *Semnopithecus femoralis* appears to occur, tends to prove, that Sir S. Raffles did not, as it has been supposed, refer to that species. His short description indicates *S. obscurus* (Lotong,) the most common species in both islands. Sir S. Raffles evidently did not describe the living animal, or he would not have omitted one of the most striking characters, viz. the white marks of the face, which, in preserved specimens, become obliterated, so that the face appears uniformly black. The omission of this character by Sir S. Raffles, and subsequently by later describers of this species, has given rise to confusion.

‡ Schinz repeats *S. femoralis*, Martin, as a Syn. for *S. sumatranus*, and says in a note, that Müller in his monograph of *Semnopithecus* refers that species to his *S. sumatranus* (Schinz Syn. Mam. I. p. 39, note.) Were even the two identical, the species should not have been renamed, as *S. femoralis*, Horsfield, not Martin, would take precedence, being the denomination under which Dr. Horsfield described it in the *Appendix to the Life of Sir T. Stamford Raffles*, 1830.

§ Martin, p. 481, refers the young *S. dorsatus* to *S. femoralis*, but the description is that of the young of the present species.

The young of this species, described by Martin, p. 481, is from the peculiar distribution of the colours, as easily distinguished from the young of *S. obscurus*, as it is difficult to distinguish the adults of these two species. Both attain to the same size, have in common the shape of the body, the white marks of the face, and the general distribution of colours. In the adult of the present species the prevailing colours are clear ashy-grey above, and white below. On either parietal bone, the hairs form a whorl, and the anterior are directed forward, projecting beyond the eyebrows. The two whorls are distinct in the young, though the hairs of the head are too short to mingle with the long, erect, divergent, black hairs of the eyebrows. Just below the spot where the two whorls come in contact, the skull is naked, thus forming a rather broad, triangular forehead. The general colour of *S. obscurus*, both in the young and adult state, is considerably darker. On the upper parts a blackish, or brownish ash colour prevails, lighter below, which acquires in some individuals a whitish appearance, from the white skin of the stomach, which is but scantily covered with hairs. Of parietal whorls there is no trace; the hairs of the head, directed backwards, originate in a peak as far down as the glabella, and are smoothed down on the top of the head from the occipital crest backward.

SEMNOPIITHECUS CRISTATUS, Horsfield.

SYN.—*Simia cristata*, Chingkau, Raffles.

Semnopithecus pruinosus, Desmarest.

Semnopithecus pruinosus, apud Lesson.

Semnopithecus cristatus, apud Martin.

Presbytes cristata, Gray:* List.

Semnopithecus cristatus, apud Schinz.*

HAB.—*Pinang, Malayan Peninsula.*

Sumatra, Borneo, Banka.

The whitish colour round the eyes and the mouth is present, though less distinct in this than in the preceding two species.

SEMNOPIITHECUS FEMORALIS, Horsfield.

SYN.—*Semnopithecus chrysomelas*, Muller, apud Martin and Schinz.

* Gray quotes *S. maurus*, Horsfield, and Schinz *S. femoralis*, Martin, as synonyms, both of which are species, in physiognomy, colours, and, as far as *S. maurus* is concerned, in habits distinctly different from the present one.

HAB.—*Purús* (on the Malayan Peninsula.)

Borneo, Java (?), Sumatra (?).

In a young male of this, apparently everywhere difficultly procurable species, the face during life was intense black, except the white-haired lips and the chin, which were of a milk-white colour. In the preserved specimen, the latter soon changed into the dull brownish-black of the rest of the face. The interdigital membrane, often loosely connecting the first phalanges of the four fingers and toes in *S. obscurus*, *albocinereus*, *cristatus* and other Malayan monkeys, was also present in this individual, in which even the first and second phalanges of the index and middle toe were thus connected. In preserved specimens, the interdigital web becomes shrivelled and indistinct, and therefore, being at all times a very questionable, if not altogether inadmissible, specific character, ought in such state to be least relied upon. On its arrival at Pinang, the animal was in too sickly a state to allow of its natural habits being observed.

GEN.—*CERCOPITHECUS*, apud *Ogilby*.

CERCOPITHECUS CYNOMOLGUS, *Ogilby*.

SYN.—*Simia cynomolgus*, Linné.

Simia aygula, Linné.

Simia attys, Schreber.

Macacus cynomolgus, Desmarest.

Simia fascicularis, Raffles.

Cercocebus aygula, Geoff. apud Horsfield.

Macacus cynomolgus, apud Gray : List.

Macacus cynomolgus, apud Schinz.

“Kra” of the Malays of the Peninsula.

HAB.—*Pinang*, *Malayan Peninsula*.

Sumatra, Java, Banka, Borneo, Celebes, Timor, Tenasserim,
Nicobar Islands.

The first phalanges of the four fingers and toes, and in some individuals also the second phalanges of the toes, are united by a membrane.

GEN.—*PAPIO*, apud *Ogilby*.

PAPIO NEMESTRINUS, *Ogilby*.

SYN.—*Simia nemestrinus*, Linné.

Simia platypygos, Schreber.

Simia fusca, Shaw.

Macacus nemestrinus, Desmarest.

Simia carpolegus, Raffles.

Macacus nemestrinus, apud Gray, List.

Macacus nemestrinus, apud Schinz.

“Broh” of the Malays of the Peninsula.

HAB.—*Pinang, Malayan Peninsula.*

Sumatra, Borneo.

The interdigital membrane of the first phalanges of the four fingers and index, and middle toe, occurs also in this species.

LEMURIDÆ.

GEN.—*NYCTICEBUS*, Geoffroy.

NYCTICEBUS TARDIGRADUS, Waterhouse, Cat. Zool. Soc.

SYN.—*Lemur tardigradus*, Linné apud Raffles.

Nycticebus bengalensis, Geoff.

Nycticebus javanicus, Geoff.

Loris tardigradus, Geoff.

Stenops javanicus, Van der Hoeven.

Stenops tardigradus, Wagner, apud Schinz.

“Kúkang” of the Malays of the Peninsula.

HAB.—*Pinang, Malayan Peninsula.*

Java, Siam, Tenasserim, Arracan, Bengal, Sylhet, Assam.

The sublingual appendage is cartilaginous, of a white colour; the apex divided in a number of fine points. The new-born is of the same colour as the adult, but paler, and has the dense, soft fur, mixed with a number of long hairs, grey at the base, white at the point. In a male, measuring from the apex of the nose to the root of the tail one foot two and a half inches, the tail five-eighths of an inch, the dimensions of the intestinal canal, were :

Small Intestines,	3 feet $\frac{1}{2}$ inches.
Large ditto,	2 „ $3\frac{1}{2}$ „
Cæcum,	0 „ $3\frac{1}{2}$ „

GEN.—*GALEOPITHECUS*, Pallas.

GALEOPITHECUS TEMMINCKII, Waterhouse.

SYN.—*Lemur volans*, Linn. apud Marsden and Raffles.

“Kúbong” or “Kúrbong” of the Malays of the Peninsula.

HAB.—*Singapore, Pinang, and other Islands in the Straits of Malacca, Lancavy Islands, Malayan Peninsula.*

Java, Sumatra, Borneo, Pelew Islands, Siam.

Two individuals are never of precisely the same design and ground-colour, which latter varies from clear ashy-grey to greyish-brown or chesnut. The white spots on the back of the anterior extremities, appear to be constant in every age. Though there are four mammæ, situated in pairs one above the other, close to the axilla, of a number of females with young, none had more than one offspring, which was carried wrapped in the wide mantle-like membrane. In several shot on the hills at Pinang, the stomach contained vegetable matter, but no remains of insects. In confinement, plantains constitute the favourite food, but deprived of liberty the animal soon pines and dies. The anterior margin of the broad smooth tongue has a fringed appearance, produced by a number of rounded papillæ. In a male, measuring from the apex of the nose to the root of the tail one foot four inches, the tail nine inches, the intestinal canal was of the following dimensions :

Small Intestines,	4 feet 4 inches.
Large ditto,	7 ,, 7 ,,
Cæcum,	0 ,, 11 ,,
Costæ veræ seven pairs, spurix six pairs.	

CARNIVORA.

CHEIROPTERA.

INSECTIVORA.

GEN.—*RHINOPOMA, Geoffroy.*

RHINOPOMA, HARDWICKII, Gray.

SYN.—*Vespertilio (Rhinopoma) Hardwickii, Elliot.*

HAB.—*Malayan Peninsula.*

Southern Mahratta country, Calcutta, Allahabad,* Agra,†
Mirzapore.

A single male, in no way differing from Bengal individuals, was obtained by Captain Congalton, H. C. Steamer 'Diana,' in a cave on an island in Girbee river, in Latitude 8° 0', on the Malayan Peninsula.

This species is provided with a true cæcum, the existence of which in all Cheiroptera has erroneously been denied, or restricted to the car-

* Numbers inhabit the subterraneous Hindoo place of worship within the Fort at Allahabad.

† In the Taj-Mahal.

diac cæcum observed in the genera *Vampyrus* and *Pteropus*. The present species, and *Megaderma spasma*, also possessing a true cæcum, thus present a higher organisation than has hitherto been attributed to Cheiroptera.

Length of the small Intestine,	$7\frac{2}{8}$ inches.
.. .. large ditto,	1 ..
.. .. cæcum,	$0\frac{3}{16}$..

GEN.—MEGADERMA, *Geoffroy*.

MEGADERMA SPASMA, *Geoffroy*.

SYN.—*Vespertilio spasma*, Schreber.

Megaderma trifolium, *Geoffroy*.

Megaderma spasma, apud *Fisber*.

Megaderma spasma, apud *Schinz*.

HAB.—*Pinang, Malayan Peninsula*.

Singapore, Java, Ternate.

Incis. $\frac{0}{4}$ Canin. $\frac{1-1}{1-1}$ Molar, $\frac{4.4}{5.5}$

Length of the head and body $3\frac{2}{8}$ inches.

.. .. inter-femoral membrane, 1 inch.

Extent of the flying membrane, .. 14 inches.

The five caudal vertebrae project one quarter of an inch beyond the pelvis, but are completely enveloped in the inter-femoral membrane, and therefore not apparent. The inguinal warts are, as in the *Rhinolophi*, most developed in the adult female. A true cæcum, though smaller than in *Rhinopoma Hardwickii*, is present in this species.

Length of the small Intestines,	7 inches.
.. .. large ditto,	$1\frac{1}{16}$ inches.
.. .. cæcum,	$0\frac{1}{16}$ inches.

GEN.—NYCTINOMUS, *Geoffroy*.

NYCTINOMUS TENUIS, *Horsfield*.

SYN.—*Nyctinomus tenuis*, apud *Fisher*.

Molosse grêle, *Temminck*.

Dysopes tenuis, *Schinz*.

HAB.—*Malayan Peninsula*.

Java, Sumatra, Borneo.

Two individuals had the back of a velvety snuff colour, becoming a shade lighter on the under-parts. Entire length of the larger four and four-eighth inches, of which the tail one and two-fourth inches. Extent of the flying membrane ten and four-eighth inches. In the size of the ears some difference exists in the two.

GEN.—TAPHOZOUS, *Geoffroy*.

TAPHOZOUS MELANOPOGON, *Temminck*.

SYN.—Taphozous melanopogon, *apud Schinz*.

HAB.—*Pulo-Tikus, Pulo-Lancávy, Malayan Peninsula.*

Java, Caves of Kannerá.

Temminck's description, as quoted by Schinz, is taken from the adult male, the Malayan individuals of which differ in having the black beard surrounded by a broad light-brown band, covering, like a pelerine, the chest and shoulders. The rest of the lower parts are either white or brownish-white. The flying membrane in the adult male is whitish; in the females and young males it is blackish or brownish between the legs, along the sides of the body and the arms. The colour of the female and young male is on the back of a more or less brownish mouse-grey, becoming much lighter or whitish beneath, but both are destitute of the black beard, which, out of a number of between forty and fifty from different Malayan localities, occurred but in seven males, although some of the beardless males in size and extent of flying membrane equalled, or even slightly exceeded, the bearded. The entire length of the largest male was four inches, of which the tail measured one inch.

Extent of flying membrane fifteen and four-eighth inches.

Dentition: Incis. $\frac{0}{4}$ Canin. $\frac{1-1}{1-1}$ Molar. $\frac{4.4}{5.5}$

TAPHOZOUS SACCOLAIMUS, *Temminck*.

SYN.—Taphozous pulcher, *Elliot MSS. apud Blyth*.

HAB.—*Pinang.*

Java, Sumatra, Borneo, Celebes, Southern India.

In two males captured at Pinang in houses in the valley, the colours somewhat differ from Temminck's description, quoted by Schinz. In the larger, the head and back are of a sooty black, with a few white dashes, the lower parts of a pure white. The flying membrane is black

between the legs, along the sides of the body and the arms, and between the index, second and third fingers; the rest being dull semi-transparent white. The length from the apex of the nose to the posterior margin of the inter-femoral margin, is four and seven-eighth inches, of which the tail measures one inch. The extent of the flying membrane eighteen inches. Dentition as in *T. melanopogon*. The smaller differs in having the chest of a pale brownish-white, the abdomen and the pubes light rust-coloured, leaving the sides pure white. Mr. Blyth quotes *Taphozous pulcher*, Elliot, from Southern India, as being "black-brown above with white pencillings, and pure white below," (Journal As. Soc. XIII. 1844. p. 492,) from which, as well as from Mr. Elliot's specimen, at present in the Museum of the Asiatic Society, it appears that the Indian more resemble the Malayan individuals than those of the Indian Archipelago, described by Temminck. The internal surface of the gular sac secretes, an odorous oily fluid, of a light brown colour.

GEN.—RHINOLOPHUS, *Geoffroy*.

RHINOLOPHUS, *Gray*.

RHINOLOPHUS AFFINIS, *Horsfield*.

HAB.—*Pinang*.

Java.

Of two individuals, the male is reddish-brown above, light greyish-brown beneath; the female is above golden fulvous, which becomes lighter on the lower parts.

Entire length of the male, .. $2\frac{4}{8}$ inches—female, $2\frac{7}{8}$ inches.

Tail, $\frac{4}{8}$,, female, $\frac{5}{8}$,,

Extent of flying membrane, .. $11\frac{2}{8}$,, female, $12\frac{4}{8}$,,

Incis. $\frac{2}{4}$ Canin. $\frac{1-2}{1-1}$ Molar, $\frac{5.5}{5.5}$

The inguinal warts are highly developed in the female.

HIPPOSIDEROS, *Gray*.

A. Adult male with a frontal pore, with a tuft of rigid hairs.

HIPPOSIDEROS DIADEMA, *Gray?*

SYN.—*Rhinolophus Diadema*, *Geoffroy?*

HAB.—*Pinang*, *Malayan Peninsula*.

Timor.

The Malayan individuals are, according to age and sex, of a more or less intense reddish or greyish-brown above, under certain lights assum-

ing a golden lustre, owing to the whitish points of the hairs; beneath, they are of a lighter greyish-brown. Individuals occur of a light golden-brown, in colours resembling *Rhinolophus larvatus*, Horsfield. In the adult male, the livid flesh-coloured nasal appendage is larger, more complicated, and somewhat different from the figure given by Geoffroy St. Hilaire, (Ann. du Muséum XX, Pl. 5 and 6), which resembles the female in the simpler appendage and in the absence of the frontal pore. The latter organ, in the adult male, is large, secreting a yellowish brown oily fluid, the odour of which resembles that of *Arctictis Binturong*, Fisher. A female, during lactation, presented a great inequality in the development of the inguinal warts, of which the right measured one-quarter of an inch in length. At the time of her capture, it was reported that a young one had been "sucking" the right wart. Not having myself observed the young clinging to that organ, I cannot vouch for the correctness of a statement which, if authentic, would tend to explain the use, being to afford support to the young, when not sucking. The size of the Malayan individuals appears to exceed those from Timor, the entire length of the former being five and six-eighth inches, of which the tail measures two inches. Extent of the flying membrane twenty-one and a half to twenty-two inches. The extremity of the 2nd phalanx of the fourth and fifth fingers is bifid, or terminating with two minute diverging joints, a structure also existing in the Malayan individuals of the following species.

$$\text{Incis. } \frac{2}{4} \quad \text{Canin. } \frac{1-1}{1-1} \quad \text{Molar, } \frac{5.5}{5.5}$$

HIPPOSIDEROS NOBILIS, Gray.

SYN.—*Rhinolophus nobilis*, Horsfield.

Rhinolophus nobilis, apud Fisher.

Rhinolophe fameux, Temminck.

Rhinolophus nobilis, apud Schinz.

HAB.—*Pinang, Malayan Peninsula.*

Java, Sumatra, Timor, Amboyna.

The frontal pore is less developed than in the former species, as compared with which the present is of a more slender form, though of a size little less inferior. Entire length five and four-eighth inches, of which the tail measures two and one-eighth inches. Extent of flying membrane twenty-one and four eighth inches. Dentition similar to that

of *H. Diadema*. In the valley of Pinang single individuals of both species are at night abroad at all seasons, but during the rains they are particularly numerous.

HIPPOSIDEROS VULGARIS, Gray.

SYN.—*Rhinolophus vulgaris*, Horsfield.

Rhinolophus insignis, Var. apud Temminck.

Rhinolophus insignis, Horsf. apud Schinz.

Rhinolophus vulgaris, Horsf. *female of insignis*, apud Schinz.*

HAB.—*Pinang*.

Java.

Entire length four inches, of which the tail measures one and three-eighth; extent of flying membrane fourteen inches.

Incis. $\frac{2}{4}$ Canin. $\frac{1-1}{1-1}$ Molar, $\frac{4.4}{5.5}$

HIPPOSIDEROS MURINUS, Gray.

SYN.—*Rhinolophus murinus*, Elliot.

HAB.—*Pinang*.

Southern Mahratta Country, Nicobar Islands.

Entire length two and four-eighth inches, of which the tail measures one inch. Extent of flying membrane nine and four-eighth inches. Dentition similar to that of the last species.

B. Forehead simple.

HIPPOSIDEROS GALERITUS, N. S.

H. prosthematicis simplicis membranâ transversâ latâ, altè erectâ, auriculas tangente; auricularum, latè pyriformium, apicibus laciniâ exsertis, besse postico lobuloque basali villosis; vellere longo, denso, molli, bicolore; suprâ saturatè, subtus pallidius-fusco-rufescenti.

Latet fœmina.

HAB.—*Pinang*.

Entire length three inches, of which the tail measures one inch. Extent of the flying membrane ten and four-eighth inches.

Incis. $\frac{2}{4}$ Canin. $\frac{1-1}{1-1}$ Mol. $\frac{4.4}{5.5}$

The livid flesh-coloured nasal appendage is simple but large, occupying the whole upper part of the face and the forehead; the horse-shoe or

* The only individual of *Rhinolophus vulgaris*, Horsfield, observed at Pinang, happened to be a *male*.

nasal disk covers the short, rounded, hairy muzzle, which has two leaves on either side; the transversal membrane is concave, as broad and long as the horizontal horse-shoe, which it joins under a right angle, while its sides are almost in contact with the ears. The latter are sub-erect, broader than long, their breadth equalling the length of the head; the shape is broad, pyriform, narrowing towards the apex, which appears like a small artificially rounded flap, scarcely elevated above the level of the fur covering the vertex. More than two-thirds of the back of the ear is covered with fur, leaving a narrow naked line along the external margin, which, as well as the singular shape of the ear itself, affords a distinguishing character. The hairs are buff or whitish at the base, the other half of their length brown. The general colour of the upper parts is deep-brown, with a slight reddish hue, becoming a shade lighter beneath.

This species somewhat resembles *Hipposideros apiculatus*, Gray (*Vespertilio speoris*, Schneider, apud Schreber; *Rhinolophus speoris*, Geoffroy,) from which it however differs in the absence of the frontal pore, in the shape of the ears, and in colours. A solitary male was captured in the valley of Pinang.

GEN.—VESPERTILIO, Linné.

VESPERTILIO, Gray.

VESPERTILIO ADVERSUS, Horsfield ?

SYN.—*Vespertilio adversus*, Fisher ?

Vespertilio adversus, Temminck ?

Vespertilio cineraceus, Blyth MSS.

HAB.—*Pinang*.

Java, Calcutta.

This bat having the characteristic distinction of the upper incisor, described by Horsfield, is above greyish-brown, beneath light-greyish, measuring in length three and two-eighth inches, of which the tail is one and four-eighth inch. Extent of flying membrane ten and four-eighth inches. It differs from *V. adversus* in having on each side five molars, of which but two are spurious, which character also obtains in *V. cineraceus*, Blyth MSS. and specimen in the Museum Asiatic Society, which (as observed by Mr. Blyth,) as well as the present, may prove varieties of *V. adversus*, Horsfield.

KIRIVOULA, Gray.

KIRIVOULA PICTA, Gray.

SYN.—*Vespertilio ternatanus*, Seba?

Vespertilio pictus, Pallas, apud Horsfield.

Vespertilio kerivoula, Boddaert.

Vespertilio kerivoula, apud Geoffroy.

HAB.—*Pinang*.

Java, Sumatra, Borneo, Ceylon.

KIRIVOULA TENUIS, Gray.

SYN.—*Vespertilio tenuis*, Temminck, apud Schinz.

HAB.—*Pinang*.

Java, Sumatra, Borneo.

A single male, in colours slightly differing from Temminck's, being above of a dark greyish-brown, many of the hairs with white points; beneath of a lighter shade. Entire length three and two-fourth inches, of which the tail one and four-eighth inch. Extent of flying membrane ten inches.

Incis. $\frac{2-2}{6}$ Canin. $\frac{1-1}{1-1}$ Mol. $\frac{5.5}{5.5}$

Trilatitus, Gray.

TRILATITUS HORSFIELDII, Gray.

SYN.—*Vespertilio tralatitius*, Horsfield.

Vespertilio Gärtneri, Kuhl, apud Schinz.

HAB.—*Pinang*.

Java, Sumatra.

Scotophilus, Leach, apud Gray.

SCOTOPHILUS TEMMINCKII, Gray.

SYN.—*Vespertilio Temminckii*, Horsfield.

Vespertilio Belangerii, Isid. Geoff.

Vespertilio noctulinus, Isid. Geoff.

Scotophilus castaneus, Gray.

Nycticeius Temminckii, Schinz.

Nycticeius Belangerii, Temminck, apud Schinz.

Nycticeius noctulinus, Temminck, apud Schinz.

“Klávah” of the Malays of the Peninsula.

HAB.—*Singapore, Pinang, Malayan Peninsula and Islands.*

Java, Sumatra, Borneo, Timor, Pondicherry, Calcutta.

As observed by Schinz, this species is very variable in its colours according to age, all of which variations occur in individuals inhabiting Pinang and the Malayan Peninsula. The following are the specific names attributed to different individuals of this species :—

1. *Vespertilio Temminckii*, as originally described and figured in *Zoological Researches in Java*. Back dark-brown; greyish-brown underneath. Entire length four inches six lin., of which the tail one five-eighth of an inch; Extent of flying membrane twelve inches.

2. *Scotophilus castaneus*, Gray.

3. *Nycticeius Belangeri*, Temminck, apud Schinz. Hairs of the back brown at the base, chesnut or olive-chesnut at the apex; beneath light yellowish-brown, isabella or whitish. Entire length $3\frac{1}{2}$ " of which the tail 1" 11" Extent of flying membrane 13".

$$\text{Incis. } \frac{1-1}{6} \quad \text{Canin. } \frac{1-1}{1-1} \quad \text{Mol. } \frac{4.4}{5.5}$$

4. *Nycticeius noctulinus*, Temminck, apud Schinz, is the very young. Above more or less intense brown or rust-coloured; beneath isabella or light greyish-brown. Entire length three to three two-eighth inches, of which the tail seven-eighth to one two-eighth of an inch. Extent of flying membrane eight six-eighth to nine inches. In this state it has frequently been observed clinging to the mother.

$$\text{Incis. } \frac{2-2}{6} \quad \text{Canin. } \frac{1-1}{1-1} \quad \text{Mol. } \frac{4.4}{5.5}$$

This species is exceedingly numerous, forming large congregations in sheltered situations on the Malayan Peninsula, and in the caves on the numerous islands of limestone which stud the shores from Maulmein to Java, and in such localities large deposits of Guano occur. The latter, ("Ty Kláwah" of the Malays, i. e. bats' manure,) has been tried by agriculturists at Pinang, but has been found much less efficacious than the Guano obtained from the swift (*Collocalia*), producing the edible nests.

FRUGIVORA.

GEN.—PTEROPUS, *Brisson*.

PTEROPUS EDULIS, *Geoffroy*.

SYN.—Pteropus javanicus, *Dcsm.* apud *Horsfield*.

Pteropus Edwardsii, *Geoffroy*.

“Kalong” of the Javanese.

“Klíang” of the Malays of the Peninsula.

HAB.—*Pinang, Singapore, Malayan Peninsula and Islands.*

Java, Sumatra, Banda, Bengal, Assam.

GEN.—*CYNOPTERUS, Fred. Cuvier.*

CYNOPTERUS MARGINATUS, F. Cuv.

SYN.—*Vespertilio marginatus, Buchanan Hamilton, MSS.*

Pteropus marginatus, Geoffroy.

Pteropus titthæcheilus, Temm.

Pachysoma titthæcheilus, Temm.

Pachysoma brevicaudatum, Is. Geoff.

Pteropus brevicaudatus, Schinz.

Pachysoma Diardii, Isid. Geoff.

Pteropus Diardii, Schinz.

Pachysoma Duvaucei, Is. Geoff.

Pteropus pyrivorus, Hodgson, apud Gray.

HAB.—*Singapore, Pinang, Malayan Peninsula and Islands.*

Java, Sumatra, Southern Mahratta Country, Bengal, Nipal.

The colour is very variable, not only individually, but according to age and sex, which has given rise to several supposed distinct species. But they all resemble each other in habits and dentition, they occupy one common place of rest, and their new-born, or very young, are of a uniform colour. The ears of the adult are, in all, more or less distinctly margined with white.

1. *Cynopterus marginatus.* Back reddish, or brownish-grey; lighter underneath.

2. *Pachysoma titthæcheilus.* 3. *Pteropus brevicaudatus.* Male: back reddish or olive-brown; a tuft of hair on the sides of the neck, the chest, and the sides of the greyish abdomen rusty, or orange-coloured. Female: above yellowish, or greyish-brown; beneath lighter. In some individuals from Malacca, the flying membrane is of a light reddish-brown.

4. *Pachysoma Diardii:* Back greyish-brown; abdomen greyish, brown on the sides.

5. *Pachysoma Duvaucellii*: pale greyish-brown.

The following is a description of a new-born. The upper part of the head, the nape of the neck, the back and the posterior surface of the humerus and femur, were covered with dense, soft, short hairs, of a dark greyish-brown; all the rest of the body was naked, of a greyish-black colour. The eyelids were not yet separated. The joints of the bones of the extremities were cartilaginous. The nails of the thumb and index were developed, but the feet and nails of the toes had already attained the size of the adult. The tongue was considerably extensile. The teeth present were:

$$\text{Incis. } \frac{4}{4} \quad \text{Canin. } \frac{1-1}{1-1} \quad \text{Mol. } \frac{2 \cdot 2}{2 \cdot 2}$$

Entire length, one and four-eighth of an inch, of which the slightly projecting tail two-eighth inch. Extent of the flying membrane, six and four-eighth inches.

In an individual measuring two and four-eighth inches in length, with an extent of the membrane of nine inches, the face and the lower parts, excepting the throat, had become scantily covered with light brownish-grey, short hairs. The eyelids were separated. The shoulder, elbow, hip, and knee-joints, had become ossified, the other joints still remaining cartilaginous.

INSECTIVORA.

GEN.—TUPAIA, *Raffles*.TUPAIA FERRUGINEA, *Raffles*.

SYN.—“Tupai Press,” *Raffles* and *Horsfield*.

Cladobates ferrugineus, F. Cuv. apud *Schinz*.

Sorex Glis, *Diard* and *Duvaucel*.

Glisorex ferruginea, *Desmarest*.

Hylogale ferruginea, *Tcmminck*.

Herpestes, *Calcutta Journ. Nat. Hist.**

* Vol. II, p. 458, Pl. XIII $\frac{1}{2}$. The explanation accompanying this figure is as follows: “Searching for Col. Farquhar’s drawing of *Rhizomys Sumatrensis* already referred to, I found in the Society a drawing of a bushy-tailed *Herpestes*, differing merely from Mr. Hodgson’s *Gulo Urva*, in having the tail of one uniform colour with the body, without the yellow tip. There is no name or letter on the drawing to shew

“Tupai tana” of the Malays of Pinang.

НАВ.—*Pinang, Singapore, Malayan Peninsula.*

Sumatra, Java, Borneo.

The young of this very numerous species in hilly jungle, is easily tamed, and becomes familiar with its feeder, though towards strangers it retains its original mistrust, which in mature age is scarcely reclaimable. In a state of nature it lives singly or in pairs, fiercely attacking intruders of its own species. When several are confined together, they fight each other, or jointly attack and destroy the weakest. The natural food is mixed insectivorous and frugivorous. In confinement, individuals may be fed exclusively on either, though preference is evinced for insects; and eggs, fish, and earth-worms, are equally relished. A short peculiar tremulous whistling sound, often heard by calls and answers, in the Malayan jungle, marks their pleasurable emotions, as for instance, on the appearance of food, while the contrary is expressed by shrill protracted cries. Their disposition is very restless, and their great agility enables them to perform the most extraordinary bounds in all directions, in which exercise they spend the day, till night sends them to sleep in their rudely constructed lairs in the highest branches of trees. At times they will sit on their haunches, holding their food between the fore-legs, and after feeding, they smooth the head and face with both fore-paws, and lick the lips and palms. They are also fond of water, both to drink and to bathe in. The female usually produces one young; she has four mammæ, the anterior pair of which is situated on the lower lateral part of the chest, the posterior on the side of the abdomen. On the lower surface of the tongue, the frenum is continued to within a short distance of the apex in a raised line, on either side of which the skin is thickened, fringed at the edges, and thus presenting a rudimentary sublingual appendage, somewhat similar

from whence it came, and to prevent its following the fate of Colonel Farquhar's *Rhizomys*, we here afford a copy of it.” Pl. XIII $\frac{1}{2}$ represents no *Herpestes*: the elongated muzzle, the proximity of the large eye to the ear, which is exposed, and not hidden by the hairs of the cheek, are characters foreign to every known species of *Herpestes*. The draughtsman has very correctly represented a *Tupaia*, and the drawing, reappearing as a *Herpestes* in the *Calcutta Journal of Natural History*, has, by Mr. Blyth, been traced to be the original of Pl. IX, *Asiatic Researches*, Vol. XIV, where it properly accompanies the description of *Sorex Glis*, (i. e. *Tupaia ferruginea*) of MM. Diard and Duvaucel.

to that observed in *Nycticebus tardigradus*; though in *Tupaia ferruginea* the fringes of the margin only are free, the rest being attached to the tongue, but easily detached by a knife. The lateral raised lines of the palms and soles, the posterior part of the first phalanges, and the third phalanx (second of the thumbs,) which is widened into a small soft disk, in fact all the points which rest upon the ground, are studded with little transversely curved ridges or duplicatures, similar to those observed under the toes, of some of the *Geckotidæ*, which fully account for the precision, the 'aplomb,' with which these animals perform the astounding leaps from below, barely touching with the soles the point d'appui above. In a cage, the Tupai will continue for hours vaulting from below, back downwards, poise itself for an instant, continuing back downwards under the horizontal roof, and regain the point of starting, and thus describe a circle—the diameter of which may be three to four times the length of the animal,—in far shorter time than is required for the description. In a young male, measuring from the nose to the root of the tail seven and three-fourth inches, the tail six and a half inches, the dimensions of the intestinal canal were:

Small Intestines,	3 feet	$4\frac{1}{2}$ inch.	; diameter	$\frac{1}{8}$ inch.
Large ditto,	0	$3\frac{3}{4}$	"	$\frac{1}{5}$ "
Cæcum,	0	$0\frac{3}{4}$	"	$\frac{1}{16}$ "
Costæ veræ: 8 pairs; spuria: 5 pairs = 13 pairs.				

This species* is infested with a Tick of the following description: *Ixodes Tupaia*. Body suboval, shining dark-green olive; scaly plate, palpi casing the pointed sucker, and the legs: pale reddish-brown. Length, when swollen, three-eighth inch.

GEN.—GYMNURA, *Raffles*.

GYMNURA RAFFLESII, Vigors and Horsfield.

SYN.—*Viverra gymnura*, *Raffles*.

"*Tikus ámbang búlan*," *Raffles*.

HAB.—*Malacca*.

Sumatra, Singaporc.

In a district not distant from Malacca, the animal is said to be numerous, though not to be seen in other localities.

* Single light coloured individuals occur with the back, limbs and abdomen greyish, whitish, or isabella.

GEN.—*Sorex*, Linné.

Sorex murinus, Linné.*

SYN.—*Sorex myosurus*, Pallas, apud Schinz.

Sorex cærulescens, Var, Raffles ?

“Chinchorot” of the Malays of the Peninsula.

HAB.—*Pinang*.

Java.

Dark brownish-grey above; beneath light brownish-grey. Feet and tail flesh-coloured in the living animal, changing to cinereous after death. In the young the colour is more of a bluish-grey, slightly mixed with brown on the back. Length of the head and body five and half inches; tail three inches.

Incis. $\frac{2}{2}$ Canin. $\frac{0}{0}$ Molar, $\frac{8.8}{5.5}$

The present differs from the ‘Musk Shrew’ of Bengal (“Choochundr,”) in its proportionally broader, more developed, and from the head more diverging ear, which characters also distinguish it from *Sorex nigrescens*, Gray, which it somewhat resembles in its colours. The smell of musk, emitted by the adult animal, and which in the young is barely perceptible, is much less intense than that of the Bengal Musk Shrew.

CARNIVORA.

GEN.—*Ursus*, Linné

Helarctos, Horsfield.

Helarctos Malayanus, Horsfield.

SYN.—*Ursus Malayanus*, Raffles and Horsfield.

“Brúang” of the Malays.

HAB.—*Malayan Peninsula*.

Sumatra, Tenasserim Provinces, Assam, Nipal.

Colour of the young: snout and lips pale ferrugineous. Head, back, and outside of the limbs black, mixed with pale rust colour, in consequence of many of the black hairs having the point, or a part next to the

* The following Syn. are given in Gray's *List of Mam. in British Museum*: *Sorex myosurus*, Pallas. Geoff. Ann. Mus. XVII. *S. Sonneratii*, and *S. giganteus*, I. Geoff. Mem. XV. *S. indicus*, Geoff. Mem. Mus. I. *S. capensis*, Geoff. Ann. Mus. XVII. *S. Pilorides*, Shaw, Mus. Lever. *S. cærulescens*, Shaw, Zool. *S. crassicaudatus*, Licht. Säügeth. *S. nepalensis*, Hodgson. *S. moschatus*, Robinson, Assam. Olivier, Voy. Buffon. H. N. Suppl. VII.

point, of the latter colour. Ears, tail, paws, and inner side of the extremities shining black. The somewhat woolly hairs of the abdomen are faintly marked with ferrugineous, and are mixed with longer stiff black hairs. As observed by Schinz, the mark on the breast is very variable in its form. It may be compared to a crescent, assuming according to the smaller or greater breadth of the limbs, the shape of the letter U, of a horse-shoe, or a heart. In the living animal it is of a pale rust, or orange colour, in some individuals with a few small blackish spots, fading after death to a yellowish-white. A very old male presented the following dentition :

$$\text{Incis. } \frac{6}{6} \quad \text{Canin. } \frac{1-1}{1-1} \quad \text{Molar, } \frac{4. 4 (2+2)}{6. 6 (3+3)}$$

In a young female, three feet in length, the intestinal canal measured fifteen feet. It had neither cæcum nor valve to mark the transition. She had ten grinders in either jaw, of which four were spurious, six true.

GEN.—ARCTICTIS, *Temminck.*

ARCTICTIS BINTURONG, *Fischer.*

SYN.—*Viverra?* *Binturong*, *Raffles.*

Paradoxurus albifrons, *F. Cuvier.*

Ictides ater, *F. Cuvier.*

Arctictis penicillata, *Temminck.*

Ictides ater, *Blainv. Calcutta Journ. of Nat. Hist.**

“*Unturong*” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula.*

Tenasserim, Arracan, Assam, Bhotan, Nipal.

Java and Sumatra are quoted by M. Schinz, but neither Dr. Horsfield, Sir S. Raffles, nor M. Temminck, (*Discours Preliminaire, Fauna Japonica,*) mention the *Binturong* as inhabiting either of the two islands.

* In the 3rd Vol. of *Calcutta Journ. of Nat. Hist.* p. 410, occurs the following passage : “The *Binturong* was first discovered in Java, but the first notice of its existence on the continent of India will be found in the second volume of this Journal, p. 457,” (sic!) “&c.” Sir Stamford Raffles, who published the first account of this animal, distinctly states, that it was discovered at Malacca, (not *Java*, as erroneously stated,) by Major Farquhar, and Malacca is situated on the continent of India as well as Tenasserim. The fact of its inhabiting *Bhotan*, was according to Cuvier (*Règne Animal*.) first made known by Duvaucel, and the author of the article “*Ictides*” in the *Penny Cyclopædia*, 1838, gives Mr. Hodgson’s authority of the *Binturong*’s inhabiting Nipal, (Kachar, though they occasionally occur in the central region of Nipal.)

The general colour of either sex is black, sprinkled on the body and extremities with pale ferruginous, produced by some of the hairs having a part next to the point of that colour. In both sexes nearly all the hairs of the head, face and throat are thus marked, which communicates to these parts a whitish or greyish appearance. In the young of either sex there is a faint trace of a white spot over the eyes. The long ear-tufts are always black, the margin of the auricle being either white, or pale rust-coloured. The tail is black, but the hairs of the anterior or basal half, are whitish at the root, or in some uniformly of that colour. The pupil is vertically contracted by the influence of light; the iris is of a beautiful Van Dyke brown. In its habits the *Binturong* is both arboreal and terrestrial, and nocturnal, sleeping till the sun is below the horizon, when it displays great agility in searching for smaller quadrupeds, birds, fishes, earth-worms, insects and fruit. The howl is loud, resembling that of some of the Malayan *Paradoxuri*. The young are easily tamed, but the old animal retains its natural fierceness. Between the anus and penis is situated a large pyriform gland, exceeding two inches in length, partially divided by a deep naked fossa, commencing from the latter organ. The gland secretes a light-brown oily fluid, of a peculiar intense, but not fetid or sickening odour. In a young male, measuring from the nose to the root of the tail, two feet three and five-eighth inches, the tail two feet two and a half inches, the intestines were of the following dimensions :

Small Intestines,	..	..	7 feet 11 inches.
Large ditto,	..	..	1 foot 10 inches.
Cæcum,	..	..	0 $\frac{1}{2}$ inch.

The circumference of the small intestines about seven-eighth inches; of the large but little more, but the rectum was thickened two inches in circumference.

The short cæcum is crescent-shaped, or lengthened pyriform. The stomach is remarkably lengthened cylindrical, the parietes much thickened towards pylorus. Oesophagus enters close to fundus ventriculi, in consequence of which there is but a slight difference between the curvatures.

Length along the greater curvature,	..	1 foot 2 inches.
„ „ „ smaller „	..	1 „ 1 „

The circumference from cardia round fundus ventriculi measured five and a half inches; round pylorus two six-eighth inches. Both the gall-bladder and the spleen presented a remarkably elongated shape. The former organ, lengthened pyriform, measured in length two inches; ductus cysticus two and a half inches. The spleen, tapering to a narrow point, was half an inch broad, and eight and a half inches in length. Costæ veræ, nine pairs; spurix, five pairs = fourteen pairs.

GEN.—MUSTELA, Linné.

PUTORIUS, Cuvier.

PUTORIUS NUDIPES, Fred. Cuvier.

SYN.—*Mustela nudipes*, Desmar. apud Schinz.

“Pulásan” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*.

Sumatra, Borneo.

The muzzle and the soles of the feet are pale flesh-coloured. The animal is said to inhabit the densest jungle, and is most difficult to obtain.

MUSTELA, Cuvier.

MUSTELA FLAVIGULA, Boddaert.

SYN.—*Viverra quadricolor*, Shaw.

Marte à gorge dorée, Desmarest.

Mustela Hardwickii, Horsfield.

Martes flavigula, Hodgson, apud Gray.

“Anga Prao” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*.

Java, Sumatra, Nipal.

The Malayan individuals differ from those from Northern India, originally described, in having the fur shorter and less dense, the head palc-brown, the neck and back pale yellowish-brown, becoming darker towards the tail, which, as well as the posterior extremities, is black. The anterior extremities are greyish-brown; the feet and the streak behind the ear deep brown; the lips whitish; the throat and chest yellowish-white or ochreous; the scanty hairs of the abdomen pale brownish.

GEN.—LUTRA, Storr.

LUTRA NAIR, Frcd. Cuvier.

SYN.—*Lutra indica*, Gray.

“Anjing Ayer” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*.

China, Bombay, South Mahratta Country.

LUTRA BARANG, Raffles.

SYN.—“Barang Barang” or “Ambrang,” Raffles.

Lutra leptonyx, Wagner, apud Schinz.*Lutra Simung*, Schinz ?*

“Mumrang” or “Amrang” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*.

Sumatra, Borneo.

The young are very playful, and soon become sufficiently domesticated to roam about the house, and to appear when called. Its voice is a short shrill whistling, not unlike the sound of the cricket, but stronger. Its food is not confined to fishes and crustacea; birds and insects are equally relished. The muzzle is hairy, but in the old animal the hairs become rubbed off. The Malayan individuals appear to attain to a greater size than the Sumatran, described by Raffles. An old male measured from the apex of the nose to the root of the tail two feet eight and a half inches; the tail one foot eight inches. In a young male two feet and two inches, and the tail one foot two-eighth of an inch in length, the simple intestinal canal measured nine feet and one inch, with a circumference throughout of about two and two-eighth inches. No cæcum. Each of the kidneys consisted of ten loosely connected glands.

AONYX, Lesson.

AONYX LEPTONYX, Gray: List.

SYN.—*Lutra leptonyx*, Horsfield.*Lutra cinerea*, Illiger.

* In Schinz's diagnosis of *Lutra Simung* is said “ungvibus robustis falcularibus,” (“die Nägel an den Zehen sind stark und gekrümmt”) which if the passage refers to *Lutra leptonyx*, Horsfield, must be a mistake, as the original diagnosis expressly states “ungvibus brevibus sublammnaribus.” As Schinz describes *Lutra Barang* “ungvibus minutissimis obtusis” *Lutra leptonyx* is probably meant, and thus the one species is mistaken for the other.

Lutra perspicillata, Is. Geoff.

Mustela Lutra, Marsden.

Aonyx Horsfieldii, Gray.

Lutra Barang, apud Schinz?

“Anjing Ayer” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*.

Java, Sumatra, Singapore, Nipal.

This, as well as the two preceding species, inhabits numerous banks of the Malayan rivers, and all are at times used by the Malays in river fishing.

GEN.—*CANIS*, Linné.

CUON, Hodgson.

CUON PRIMÆVUS, Hodgson.

SYN.—*Canis primævus*, Hodgson.*

Chrysæus primævus, Hamilton Smith.

Chrysæus soccatus, Cantor.

“Anjing útan” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*.

Bengal, Nipal.

Some slight differences occur in the Malayan individuals. The inferior surface, the inside of the ears and limbs, the lips and throat, are of the same colour as the back, but much paler. A black carpal spot, like that of the wolf, is very distinct in the male, less so in the female. The young animal of either sex has a faint white spot with a few blackish bristles, situated nearly midway between the angle of the mouth and the ears. Of the wavy wool of the Buansu, the Malayan wild dog, inhabiting a tropical climate, has but a little on the inner side of, and immediately behind the ear; the posterior part of the abdomen is almost naked. The short bristles of the lips, cheeks, throat, and above the eyes, are all black. In habits, so fully described by Mr. Hodgson, and in size, the Malayan agrees with the Nipalese. In a young male, from

* Mr. Ogilby considers *Canis Dukhunensis*, Sykes, and *Canis primævus*, Hodgson, to be identical, and apparently not different from *C. sumatrensis*, Hardwicke, (*Mem. on the Mammalogy of the Himalayahs*, apud Royle.) Colonel Sykes, on the contrary, describes *C. Dukhunensis* as being “essentially distinct from *Canis Quao*, or *Sumatrensis*, Hardwicke.”

the nose to the root of the tail two feet eight and a half inches in length ; the tail one foot, the intestinal canal was of the following dimensions :

Small Intestines,	..	..	..	6 feet	2 inches.
Large, ditto,	..	..	..	0 ,,	10 $\frac{1}{2}$,,
Cæcum,	..	..	..	0 ,,	4 ,,

The latter intestine is spiral, much widened at the origin.

Costæ veræ 8 pairs, spuria 5 pairs = 13 pairs.

The Malays mention another, black wild dog ("Anjing útan étam,") as also inhabiting the densest jungle. A Hyena is also reported to occur on the Peninsula.

Mongrel curs, "pariah dogs," of every description, infest every village, but apparently not uninhabited places, nor localities far distant from the dwellings of man. As they all may be said to be in a state of half domestication, and are of forms very different from the wild dog, which shuns the human presence, their origin cannot with certainty be traced to the Malayan Peninsula.

GEN.—VIVERRA, Linné.

VIVERRA ZIBETHA, Linné.

SYN.—Viverra undulata, Gray.

Viverra melanurus, Hodgson	} Apud Gray: List.
Viverra orientalis, Hodgson	
Viverra civetoides, Hodgson	
Undescribed Civet, McClelland	

"Tanggallong" of the Malays of the Peninsula.

HAB.—Pinang, Singapore, Malayan Peninsula.

Southern China, Siam, Bengal, Khasyah Hills, Nipal.

Judging by the comparatively few individuals observed in the Straits of Malacca, this species would appear to be far less numerous, than the following. Of several, the largest, which was a female, measured from the apex of the nose to the root of the tail two feet and eight inches ; the tail one foot eight and a half inches.

VIVERRA TANGALUNGA, Gray.

SYN.—Viverra Zibetha, Lin. apud Raffles.

"Tangalung," Raffles.

Viverra Zibetha, Lin. apud Horsfield.

Viverra Zibetha, apud Fred. Cuvier.

Viverra Zibetha, Lin. apud Schinz.*

“Músang jebát” of the Malays of the Peninsula.

HAB.—*Pinang, Singapore, Malayan Peninsula.*

Sumatra, Borneo, Celebes, Amboyna, Philippines.

This species is readily distinguished from *V. Zibetha* by a continuous longitudinal black band occupying the upper surface of the tail, the numerous irregular rings being separated only on its inferior half. (Gray : Proceed. Zool. Society, 1832, p. 63.) The number and distance of the half rings on the lower surface of the tail, vary in different individuals, some of which have either the entire tail, or the anterior half or third of the tail, thus marked, the rest being black. The very young animal is generally of a much darker ground colour than the adult, and the black marks are therefore less conspicuous. Under certain lights the colour appears uniformly black. *Viverra Tangalunga* and *Zibetha*, however similar in habits and general colours, neither live nor breed together. Placed side by side, the living animals present a marked dissimilarity of countenance, which although obvious to the eye, would be most difficult, if possible at all, to convey in words. The female has three pairs of Mammæ, and produces from one to three young. The Malays of the Peninsula distinguish by different names the *Zibetha* and the *Tangalunga*, but as they suppose the civet of the former species to be of better quality, perhaps because it is scarcer, they will frequently offer for sale individuals of the latter, exceedingly numerous species, imposing upon it the name of *V. Zibetha*: “Tanggalong” of the Peninsula. The largest individual of the present species observed, measured in length from the apex of the nose to the root of the tail three feet and one inch; the tail one foot five and a half inches. In a younger, a female, three feet five and a half inches in length, of which the tail one foot and one inch, the intestinal canal was of the following dimensions :

Small Intestines,	..	..	..	7 feet 5 inches.
Large ditto,	..	..	..	0 ,, 9 ,,
Cæcum,	..	..	..	0 ,, 1 ,,

Costæ veræ, seven pairs; spuris, six pairs = thirteen pairs.

* The true *Viverra Zibetha*, Linné, is quoted by Schinz under the denominations of *V. bengalensis*, Hardwicke (?), and *V. melanura*, Hodgson.

VIVERRICULA, Hodgson.

VIVERRICULA MALACCENSIS.

SYN.—*Viverra malaccensis*, Gmelin.

Viverra Rasse, Horsfield.

Viverra Gunda, Buchanan Hamilton MSS.

Viverra indica, Geoffroy.

Viverra bengalensis, Gray: Illustr.

Viverra pallida, Gray: Illustr.

Genetta Manillensis, Eydoux.

HAB.—*Malayan Peninsula*.

China, Philippine Islands, Java, Singapore, Cochin-China, Tenasserim Provinces, Bengal, Nipal, Hindoostan, Dukhun, Bombay.

On the Malayan Peninsula this species appears to be more numerous than *V. Zibetha*; less so than *V. Tungalunga*, and in size inferior to either. The largest observed was three feet four inches in length, of which the tail one foot three and a half inches. In a male, measuring from the apex of the nose to the root of the tail, two feet and three-fourth of an inch, the tail one foot one inch, the dimensions of the intestinal canal were:

Small Intestines,	..	..	..	4 feet 0 inch.
Large ditto,	..	..	..	0 „ 8 „
Cæcum,..	..	..	..	0 „ 0 $\frac{3}{4}$ „

The three preceding species have the following characters in common—The pupil is vertical, oblong; the iris of a rich brown. They are arboreal as well as terrestrial, preying upon the smaller quadrupeds, birds, fish, crustacea, insects and fruit. Naturally very fierce, they are scarcely reclaimable except in youth, but with age the original disposition returns. Their voice is peculiar, hoarse and hissing.

GEN.—PRIONODON, *Horsfield*.

PRIONODON GRACILIS, *Horsfield*.

SYN.—*Viverra?* *Linsang*, *Hardwicke*.

Felis gracilis, *Horsfield*.

Viverra Hardwicke, *Lesson*.

Viverra gracilis, *Desmarest*, apud *Schinz*.

Linsang gracilis, *Müller*, apud *Gray*: *List*, and *Schinz*.

HAB.—*Malayan Peninsula.*

Java, Sumatra, Borneo, Siam.

The ground colour is buff, and the dark marks are of a deep snuff colour, inclining to black with purple reflection. Length from the apex of the nose to the root of the tail: one foot six inches, the tail one foot three six-eighth inches.

Mr. Rappa, for many years a dealer in objects of natural history at Malacca, who previously had been supplied with a figure and description of *Prionodon gracilis*, reported in a memorandum accompanying the specimen, that it had been captured in the jungle at some distance from Malacca. It was unknown to himself and to the natives. At first the animal was fierce and impatient of confinement, but by degrees it became very gentle and playful, and when subsequently suffered to leave the cage, it went in search of sparrows and other small birds, displaying great dexterity and unerring aim in stealthily leaping upon them. Fruit of every description it refused. Another younger individual was captured about the same time, but contrived to make its escape.

GEN.—*PARADOXURUS*, *Fred. Cuvier.*

PAGUMA, Gray.

PAGUMA LEUCOMYSTAX, Gray: List?

SYN.—*Paradoxurus leucomystax*, Gray?

Amblyodon auratus, Jourdan?

“*Músang búlan*” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula.*

Singapore, Sumatra.

In a single individual observed, the hairs of the body, limbs and anterior third of the tail, are greyish-yellow at the base, next bright rust-coloured, with the apex shining black, which produces a mixture of ferruginous and black, the latter prevailing on the nape of the neck, middle line of the back, and the anterior third of the tail. The hairs of the vertex and the ridge of the nose are dark at the base, with yellowish points. The large oblique whitish spot in front of the ear, produced by uniformly whitish hairs, is on either side blended with the whitish vertex and ridge of the nose, and is continued down the sides of the neck, forming a large broad arrow-shaped mark. The orbits are dark brown, the face, lips and throat pale brown. The long rigid white

whiskers are mixed with a few shorter black bristles. The feet are dark brown, the posterior two-thirds of the tail uniformly black. The lower surface and the inner side of the extremities are pale ferruginous. From the apex of the nose to the root of the tail: two feet three inches, the tail one foot eight inches.

PAGUMA TRIVIRGATA, Gray: List.

SYN.—*Viverra trivirgata*, Reinwardt, Mus. Leyd.

Paradoxurus trivirgatus, Gray.

“Músang ákar” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*.

Singapore, Tenasserim.

The ground colour varies from yellowish, or brownish, to blackish-grey. Fur short, peculiarly soft, silky. The dorsal streaks are either continued, undulated, (the central nearly always,) or composed of separate black spots. Some individuals have a short white streak on the ridge of the nose. The largest male measured from the apex of the nose to the root of the tail, two feet two and a half inches; the tail two feet three inches.

PARDOXURUS MUSANGA, Gray.

SYN.—*Viverra hermaphrodita*, Pallas, apud Schinz.

Viverra fasciata, Gmelin?

Viverra Musanga, Marsden, Raffles.

Musang bulan, Raffles.

Viverra Musanga, Var. *javanica*, Horsfield.

Ichneumon prehensilis, Buchanan Halmilton MSS.

Platyschista hermaphrodita, Otto

Paradoxurus Pallasii, Gray

Paradoxurus Crossii, Gray

Paradoxurus dubius, Gray

} apud Schinz.

Paradoxurus Musangöides, Gray.

Paradoxurus typus, apud Schlegel.

Paradoxurus felinus, Wagner, apud Schinz.

“Músang” or “Músang Pándan,” (when the tail is with white point: “Músang Búngkwang,”) of the Malays of the Peninsula.

HAB.—*Pinang, Singapore, Malayan Peninsula*.

Java, Sumatra, Borneo, Timor.

The ground colour and dorsal marks of this exceedingly numerous species are liable to considerable variations, the principal of which are noted by Schinz: individuals occur (probably of every species) with the apex of the tail white, with elongated white spots on the abdomen, with the tail spirally twisted. In most the dorsal marks become indistinct, or invisible in certain lights. The female has from one to three young, of colours similar to the adult, but less distinct, their fur is softer, somewhat woolly, mixed with longer stiff black hairs. The young is tamed without difficulty, and is sometimes kept in houses to destroy rats and mice. The *Paradoxuri* are in habits like the *Civets*. They have an elliptical pupil, vertically contracted by the influence of light. Their glandular secretion is of a peculiar, not civet or musk-like odour. The largest specimen of a great number, measured from the apex of the nose to the root of the tail two feet and half an inch; the tail one foot four and a half inches. In a male, measuring three feet one and a half inch in length, of which the tail one foot four and a half inches, the intestinal canal were of the following dimensions:—

Small Intestines,	5 feet 8 inches.
Large ditto,	0 ,, 5 ,,
Cæcum,	0 ,, 1½ ,,
Costæ veræ, seven pairs; spuria, six pairs = 13 pairs.	

PARADOXURUS (?) DERBYANUS, Gray.

SYN.—*Paradoxurus?* Zebra, Gray.

Hemigalea Zebra, Jourdan.

Viverra Boiei, Müller.

“Musang Batu” or “Sangah Prao” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula.*

Borneo.

The ground colour varies from pale ochreous to buff, and the dark marks in shape and number scarcely alike in any two individuals, from snuff colour to black. The species is apparently not numerous, and is celebrated among the Malays for its great agility. It is said chiefly to feed upon the larger birds, such as the *Argus* pheasant, which it will hunt down, following its prey till the strength of the latter is exhausted, when it falls an easy victim to the indefatigable pursuer. The slender vermiform mack, the countenance and distribution of

colours ; the serrated, flattened false molars ; the soles, hairy between and under the toes, and slightly in the centre ; the somewhat removed thumb, are characters by which this animal differs from *Paradoxurus*, and forms a link between that genus and *Prionodon* in the same manner that *Viverricula* connects *Viverra* to *Prionodon*. The largest male observed measured from the apex of the nose to the root of the tail two feet ; the tail one foot and four inches.

GEN.—CYNOGALE, Gray.

CYNOGALE BENNETTII, Gray.

SYN.—*Viverra* (*Limictis*) *carcharias*, Blainville.

Potamophilus barbatus, Kuhl.

Cynogale barbata, Schinz.

HAB.—*Malayan Peninsula*.

Sumatra, Borneo.

The very young, of which two individuals, a male and a female, were found with the mother, differ from the adult in having a very soft, silky, dense fur, mixed with longer hairs, which are black, except on the chest and abdomen, where the apex is silvery. Over the tarsus and on the upper surface of the feet some of the hairs have a subterminal white band, close to the black apex. The posterior margin of the ear is hairy and of a silvery colour. This animal appears to be of rare occurrence on the Malayan Peninsula, and the natives are consequently not acquainted with it. The largest male examined measured from the apex of the nose to the root of the tail two feet three inches ; the tail eight inches.

(To be continued.)

Notes, chiefly Geological, on the Coast of Coromandel, from the Pennaur to Pondicherry. By Captain NEWBOLD.

The coast from the mouth of the Pennaur to Madras, is a sandy plain, covered with reddish sandy loam which occasionally passes into clay, and generally rests upon the bluish-black marine clay of the Coromandel. It has been already said, that the breadth of the latter stratum varies, and is interstratified with layers of sand and reddish clays;—the whole resting usually on granitic or hypogene rocks: nodules and masses of a concretionary sandstone are found imbedded in the sands close to high-water mark, often perforated by lithodomi. Magnetic iron sand is found in many situations mingled with the sea sand, derived probably from the hornblende and basaltic greenstone rocks. This iron sand occasionally, I suspect, contains potassium, and strongly resembles iserine in external character.

Farther inland, between the base of the ghauts and the sea, extend thin beds of laterite, and sandstone closely allied to laterite, passing into puddingstones and soft shells of various colours.

The puddingstones usually imbed rounded pebbles of white quartz, and of the older sandstone which crests the eastern ghauts near Nagghery, Udegherry, &c.

The beds of this sandstone rarely exceeds three or four feet in thickness, and may be seen near Sri Permatoor, on the great western road, (vide Notes from Mangalore to Madras), and, according to native information, in the vicinity of Parmaulnagpet, about six and a half miles to the E. by S. of Tripassore, a little north of the road to Madras. Their continuity, and that of the laterite beds, with which they are probably contemporaneous, has been much interrupted by aqueous denudation, which probably took place while the Coromandel Coast was emerging from the bed of the sea.

It is also probable that these sandstone strata were once continuous with those imbedding silicified wood at Pondicherry and Verdachellum in south Arcot.

These remarks are merely thrown out to elicit farther investigation and research into the age, and extent on the coast, of these interesting littoral deposits, by which we may be enabled, probably, to mark out the ancient lines of coast formed, as the land gradually rose.

From its flatness the plain of Coromandel has been usually neglected by geologists as of little promise, but I trust, these remarks will prevent observers from running over it in the dark.

The sandstones and slate clays should be diligently examined for organic remains, as after all, it is possible, they may be freshwater deposits.

Of the sea and its inroads upon the land, from the Pennaur to the mouth of the Cauvery, the natives preserve many wild traditions, which I have little doubt originated in a sinking of this part of the coast.

In a Mahratta MS. of the Mackenzie collection,* there is a legend of the origin of the town of Sri-hari-cota, on the south boundary of Telinghana, close to the west shore of the Pulicat lake, which states the submersion of another town; the ruins of which, according to the MS. are still to be seen underneath the water. Trisancu, a king of the Solar race, is said to have been founder of it.

The miracle of the sea shell passing by a subterranean passage to the Panduranga temple, might have originated from the circumstance of subterranean beds of marine shells being found, as at Madras, &c. inland.

The Pulicat lake is a lagoon running down the coast from Derazpatumam on the north, to Pulicat on the south, nearly forty miles long, and varying in breadth from a few yards to twelve miles. A spot of sand from a quarter of a mile to five miles broad, running parallel with the coast, separates it, excepting four narrow openings, from the Bay of Bengal. Three of these openings are at its northern and southern extremities, and the other between the hamlets of Ryadooroo and Dayullum.

The lake is studded with numerous islets: its inland or western shore is low and sandy, furrowed by numerous rills which run down during the monsoon from the sides of the eastern ghauts, (here having the local name of the Pulicat hills), about eleven miles to the westward.

The lake is in general shallow, and its formation is attributed to the sea bursting through the sand-bank in front on the low ground inland, now its bed. I am not aware of any other tradition which refers its origin to the historic period, except that just alluded to.

* Madras Journal, No. 30, p. 85.

Madras.—Granite and the hypogene schists, have been before stated as the rocks basing the more recent deposits covering the level plain of Madras. In the bed of the river (Adyar) near Marmalong bridge, and on its right bank at the quarries for the old breakwater, in the park of Guindy, around the race course, it usually contains but little mica, being composed of grains of a greyish quartz, with white felspar usually weathered and earthy on the exposed bosses and blocks in which the rock makes its appearance. Much of the granite near the Little Mount I found to be pigmatitic, that is, a binary granite of felspar and quartz, without mica.

Laterite is seen overlying the granite at the breakwater quarries before mentioned, and I am informed by Capt. Worster, that beds of this rock occur about a mile north of Nabob's Choultry on the Poonamalee road;—also near Tremungalum, about two miles NE. of Santivellore; near Vungada, about two miles SE. from Sri Permatoor; at Cotrumbaucum, half a mile north of Raja's Choultry, and about two miles north of Balchitty Choultry; besides the beds at the Red hills, about eight miles NW. from Madras, so ably described by Mr. Cole, and which occupying an area of about fifty miles, cover an undulating tract, elevated usually forty or fifty feet above the general level of the country. Those near Sri Permatoor tank, I have already noticed (vide notes from Mangalore to Madras.)

At the bases of St. Thomas' Mount and the Palaveram Hill, granite is seen outcropping, and it also forms some of the smaller hills in the vicinity of Palaveram.

Both the Palaveram Hill and that of St. Thomas' Mount, are composed for the most part of a massive variety of hornblende rock, in which stratification is indistinct.

This rock, though often entirely composed of black brilliant hornblende, at Palaveram is usually a dull olive-green colour, translucent at the edges, and appears to be a mixture of hornblende and felspar, with a small proportion of quartz, in an almost homogeneous mixture. This rock occasionally imbeds garnets, crystallized schorl, hornblende, and a little dark mica. A little to the SSE. of the Mount, near the tank, is a lateritic bed.

The height of the Palaveram Hill, on which the bungalow built by Col. Coombes stands, Lieut. Ludlow informs me, is nearly 345 $\frac{3}{4}$ feet above the plain at its base.

Chingleput.—This is the judicial head-quarters and capital of the Jaghire of the same name; it is situated about thirty-six miles to the SSW. of Madras, at the base of a small cluster of hills; the loftiest not being higher than the Flagstaff hill at Palavcrum, and composed of a precisely similar variety of hornblende rock (garnetiferous), and associated with binary granite, or pignatite.

The hornblende rock passes into light shades of green. It has been largely used as a building stone in the construction of the fort, which is extensive, and said to be nearly two miles in circumference. It, as well as the town, lies on a stream, which falls into the Palaur, about half a mile to the west, almost surrounded by this hilly cluster. A wet ditch surrounds the outer walls which enclose a citadel,—the remains of the ancient palace of the native princes, government offices, and barracks, &c. Near the outer gate is a weaving establishment; and on a neighbouring eminence stands the European burial ground. The native town is populous; the houses are, for the most part, built of mud, thatched, or tiled.

Chingleput was early a place of importance, and for some time the residence of the Hindu princes of the Bijanugger dynasty.

During the early wars, when the French and English were struggling for empire in the East, the occupation of Chingleput, which lies on the great southern road to Madras from Pondicherry, was a point of much consequence. It was captured by the French in 1761, but retaken the following year by Capt. Clive. It was here the English army under Sir Hector Munro retreated (11th September, 1780) from Conjeveram, after the fatal massacre of Baillie's detachment near Perambaucum.

The soil in the vicinity is sandy, but in some places overlies a stiff clay used for bricks and tiles. The cultivation is principally of rice, irrigated by a tank which lies to the east of the Madras road.

Carangooly.—The sandy bed, sometimes occupied by a muddy torrent of the Palaur, is crossed about two and a half miles SW. from Chingleput. It is about three-quarters of a mile from bank to bank. This river, which takes its rise in the table lands of Mysore in the elevated tracts, (their water sheds) between Colar and Nundi-droog, pursues a SE. course by Baitmungalum and Watlaconda-droog, to the Pullur gap in the eastern ghauts, whence it descends to the vale of Amboor. Here, following the north-easterly direction and slope of the valley which it

fertilizes, it washes the feet of the eastern ghauts, receiving many mountain tributaries to the base of Amboor-droog; whence, turning the northern flank of the Rajahpollium and Javadie hills, which bound the right of the valley, it escapes easterly by Paliconda to Vellore. Thence it crosses the Carnatic increased by the Poni; by Arcot, Wallajahbad, Conjeveram, and Chingleput to the Bay of Bengal, into which it flows about three and a half miles, south of Sadras, in latitude $12^{\circ} 28'$ N. after a course of about 220 miles, marked during its progress through the Carnatic by a narrow, verdant, winding zone of rich vegetation.

The road from Chingleput to Carangooly lies at no great distance, for the first and greater part of its course, from the right bank of the river, over the plain on which the town and fort of Carangooly stand, to the eastward of the large tank, and about thirteen miles SSW. from Chingleput. A few low hills in the vicinity mark the prolongation of the bed of hornblende rock observed at St. Thomas' Mount, Palaveram, and Chingleput. The prevailing soil is a sandy loam.

Carangooly, like Chingleput, during our early wars with the French, was a military post of great importance, though now reduced to insignificance. The gates of the fort were blown open, and the place stormed by Capt. Davis (January 24th, 1781): Hyder's garrison was 700 strong.

The fort was dismantled by General Stuart, in February 1783.

Permacoil.—The route to Permacoil lies over a plain less cultivated and more jungly than hitherto; varied at Achcrowauk by a range of hills running for two or three miles in a SW. direction, flanking the right of the road. At Permacoil the granitic rocks rise above the surface in clusters varying from 100 to 300 feet high. The chief mass is composed of felspar, quartz, mica, and hornblende, in some places veined by a porphyritic granite with large plates of mica. The mica is sometimes entirely replaced by hornblende in the same mass, and would be termed a syenite by many geologists. I picked up a few crystals of adularia in the gravelly detritus of a weathering vein, and some fine specimens of an iridescent felspar. The felspar, which prevails in the substance of the rocks, is reddish, and the mica dark coloured, but it sometimes occurs in rich gold coloured scales and plates.

The soil is a greyish, friable loam, passing into reddish and sandy, and usually rests on a bed of kunker; below which, in a bed of sand and gravel, water is found at depths of from eight to fourteen feet from the

surface. The surrounding country is generally rocky and jungly. Rice, raggi, kovaloo, and bajra are the staple articles of cultivation.

With the exception of two or three families of Palicars and Brahmins, speaking Telinghi, the inhabitants are chiefly of the Pallaywar caste, and speak Tamul: there are still a few Mussulmen left here. The town is situated a little south of the tank bund, at the western base of the rocks, and is said to contain about 600 houses.

The remains of the fort stand on a steep rock, overlooking the town, about 300 feet high, and not commanded by any of the surrounding heights. Like Carangooly and Chingleput, it became of importance as a military post during hostilities with the French. In 1760 it was taken after a severe assault by Sir Eyre Coote, who was wounded here; besieged by Hyder in 1781 but not taken, and again in combination with the French in 1782, to whom it was compelled to capitulate on the 6th May.

It was subsequently blown up and dismantled: but in the succeeding war with Tippoo, it was held as a post of observation by a company under an officer, which was cut off by Tippoo in 1791.

Murtandi Choultry.—This place is situated on the celebrated Red hills which run to the rear of Pondicherry, from which it is about four and a half miles NNE. These beds of sandstone, which extend probably farther to the NE. will be described more fully when speaking of Pondicherry. They overlie the Neocomien limestone beds, which are seen outcropping nearer the sea to the NE. in the vicinity of Conjimere, about ten miles north from Pondicherry, on the Madras along shore road, &c. which passes by Sadras and the seven Pagodas—the ruins of Mahabalipuram, or Mavellipuram, as it is called by natives. These ruins lie among a cluster of low rocks which project from a sandy spit running down the coast from Covelong to Hedoor, a distance of about sixteen miles in breadth. It varies from half a mile to one and a quarter of a mile. In front, dashes the everlasting surf; in rear lies a salt marsh of upwards of a mile broad in some parts, and communicating with the sea on the south and north extremities of the sand bank in its front, by two narrow openings. The principal sculptured rocks lie about two and three-quarter miles from the south extremity of the bank, almost abreast, but a little south of, the Chingleput hills already described. In the monsoon they are insulated from the main-land by the inundation of the salt marsh in their rear.

A series of bare granite rocks, naturally of fantastic contour, nearly a mile long and 120 feet high, has afforded the Hindu artist ample scope for the exercise of his chisel, which must have been wrought of the finest tempered steel, for which India, since the dawn of history, has been justly celebrated. The bronze tools of the Egyptians might answer well enough in the limestone quarries around old Cairo, in working the blocks which constitute the great bulk of the pyramid, but would be of little avail in the quarries of Syene, a type of whose granite we find in the redder felspar. Quaternary granites compose the great monolith *raths* of the seven pagodas—a mixture of red and white felspar, white quartz, dark mica, and hornblende. It is more than probable that Indian steel found its way into Egypt during the early traffic that is known to have subsisted between India, Judæa, Yemen, and Egypt. It is absurd to suppose, that the sharply cut and deeply engraved hieroglyphics which cover the granite obelisks of Egypt, were done with chisels of bronze, even armed with corundum dust.

Quintus Curtius informs us, that Porus presented Alexander with a quantity of steel as one of the most acceptable and valuable gifts India could offer.

The granite blocks here, as elsewhere in India, are subject to spontaneous concentric exfoliation and splitting. The globular mass apparently about sixty feet in circumference, which we see nicely poised on a convex mass of granite—the pat of butter petrified by the god of milkmaids, Krishna—is ascribable to the first process; and the rents in the sculptured rocks—one of which cleaving the monolith pagodas, was ascribed by Mr. Chambers to a violent earthquake—have doubtless been caused by the latter process of spontaneous splitting.

With regard to the Brahmanical history of the seas overwhelming the ancient city and rolling over its ruins at the fiat of the God of the Heavens, Indra, who, it is said, loosed the chains of the ocean and overwhelmed its wicked ruler Malechereh, there are few facts that can be relied on—except that pieces of pottery, Roman and Chinese coins, are occasionally washed ashore in storms, and the remains of ruins and sculptured rocks are at a little distance in the sea.

From a multitude of enquiries which I have made regarding the encroachment of the sea on various parts of the Coromandel Coast, I am led to think, that the shore has been subject, like that of the Baltic, to

undulations, causing the sea to encroach and recede in different parts. Marks on the rocks, as on those of the Baltic and Caspian, would serve to determine the question.

From the inscriptions hitherto deciphered, nothing decisive has been obtained as to the date of the sculptures. In the 3rd report, by Taylor, on the Mackenzie MSS. section 9, we find it stated that in the Cali Yuga, Singhama Nayadu, a zemindar of the Vellugotivara race, ruled at Mallapur, (Mavellipoor). In that time during a famine many artificers resorted hither, and wrought on the mountain a variety of works during two or three years. Ignorant people term these things the work of Visvacarma; but, (says the writer) the marks of the chisel remaining disprove that opinion. Besides Singhama Nayadu built a palace on the hill, of which a few fragments now only remain. "In another MS. we find a Singhama Nayadu mentioned as son of Vennama Nayadu, and who became head of his race, and whose brother made successful incursion against Canchi and the Pandya kings, and beat the Musulmans."

There must be always some doubt until the identification of this Singhama of the Cali Yug and the Singhama who lived at the time of the Mohomedan invasion, a period not more remote than the 7th century of the Christian era.

Mr. Walter Elliott, with the aid of inscriptions he has lately brought to light at Idian Padal, two miles north of Mavellipoor, in old Tamul characters, one of which bears the name of Tribhuvana Vira Deva, a Chola king—and other collateral evidence—infers that its rulers were in a state of independence during the 6th and beginning of the 7th centuries.*

None of these inscriptions bear the special number of the year, but Mr. Elliott mentions one, in the neighbouring hamlet of Parajaskaran Choultry—in the same character as those of Idian Padal, and Varaha Swami—as bearing the name of the reigning sovereign Vikrama Deva, and the date of 1157 of the Salivahana era. The other names of sovereigns that occur, are Kama Raja and Ati Rana Chanda Pahava.

These inscriptions referred merely to grants and sales. The time in which Tribhuvana Vira Deva ruled remains to be fixed. But even when this is accomplished, we shall be still in the dark as to the exact date of

* Madras Journal, No. 30, for June 1844.

these singular sculptures which resemble,* as Mr. Fergusson justly observes, in plan and design the Hindu series at Ellora, though many of their details are only to be found at Ajunta and Salsette. It is evident, however, that the rocks were executed under the direction of priests of Siva and Vishnu, as no traces of Buddhism or of the Jains are seen.

From the inscriptions hitherto brought to light, I coincide with Mr. Elliott in supposing that the character in which some of them are written, (Grantham and Nagri) are not older than the 6th century. The freshness of the chisel-marks on the granite on which Mr. Taylor and some other antiquarians found, in part, their suppositions of a still more modern origin, (viz. from 300 to 500 years) cannot be relied on, as the marks in the quarries of Syene, and in the defile leading from Thebes to Cossier testify.

One general remarkable feature in these sculptures remains to be noticed, viz. that they have been left apparently in haste, being all unfinished. Mr. Goldingham mentions a tradition of the workmen, who had emigrated from the north, having suddenly been recalled by their prince before they had completed them. This tradition, and the similarity of the sculptures to those of the Deccan, are in favour of the theory that they are not the work of the inhabitants of the country, yet the inscriptions in the old Tamul character must have been executed probably at a later period than the others, under the directions of the Tamul or Chola princes, or priests.

I am not aware whether the inscriptions on the monolith *Ruths* have as yet been fully deciphered. It is probable they may throw light on the era of the Ati Rana Chanda, the lord of kings, who is declared by the inscription on granite, (north of the pagoda, two miles north of the place) to have built it; and of the Kama Rajah who founded the temple to Siva, according to the Sanscrit inscription in the temple of Ganesa. The antiquity of these inscriptions beyond a certain era may be negatively inferred from the absence of the date either Vikramaditya or Salivahana.

The Revd. Mr. Taylor, who has catalogued the Mackenzic inscriptions, states, that he has not met with inscriptions with a defined year higher

* Journal Royal As. Soc. Part. I, No. XV, p. 88.

up than the 10th century*. I have only met with one of the 9th century on stone, but copper grants have been found with earlier dates extending to the 5th century.

Pondicherry.—From Murtandi to Pondicherry, the loose sandstone of the Red hills extends on the right, and a sand-covered beach on the left. The nature of the substrata at Pondicherry has already been described in the notes from Pondicherry to Bepoor.

A Canal Act of the Emperor Akbar, with some notes and remarks on the History of the Western Jumna Canals. By Lieut. YULE, Engineers, First Assist. W. J. C.

For the following translation of a Decree of the Emperor Akbar, forming an interesting Appendix to the History of the Canals, given by Colonel Colvin in the 2nd volume of the Journal of the A. S., I am indebted to the kindness of Capt. S. A. Abbott, in charge of the Kythal district, who obtained the Persian copy from the parties named below, residents of Dhátrat, a town on the southern boundary of Kythal, just at the point where the Hansi branch of the Western Jumna canals enters the Chitang Nálá, in the old channel of which, deepened and widened, the canal waters flow to their termination at Baháderá, in the Bikaner territory.

Translation of a Sanad of Akbar Sháh Bádsháh, dated month of Shawál, A. H. 978, [A. D. 1568] at Fírozpúr, in the Province of Lahaur. Obtained from Abdul Samad and Abdul Mustakím, Pírzádahs at Dhátrat, being four leaves abstracted from a book which bears the appearance of considerable antiquity.

“ My Government is a tree, the roots of which are firm in the earth, and being watered by the waters of God’s grace, its branches reach to Heaven. In acknowledgment of God’s mercy in establishing this great empire, my desire, purer than water, is to supply the wants of the poor ;

* Madras Journal, No. 30, p. 41.

and the water of life in my heart is larger than the sea, with the wish to dispense benefits, and to leave permanent marks of the greatness of my Empire, by digging canals, and founding cities, by which too the revenues of the Empire will be increased.

“God says, sow a grain, and reap sevenfold(a). My desire is to reap one-hundredfold, that my crown may become wealthy, and that the zamindars may obtain double returns.

“The seeds sown in this world, are reaped in the next.

“The Omnipotent God gives power to whom he pleases.

“The following is the best purpose to which my wealth can be applied, viz.—

“The Chitang Naddí, by which Fíroz Sháh Bádsháh, two hundred and ten years ago, brought water from the nálás and drains in the vicinity of Sádhaura(b), at the foot of the hills, to Hánsí and Hissár, and by which for four or five months in the year water was then available, has, in the course of time, and from numerous obstacles, become so choked, that for the last hundred years, the waters have not flowed past the boundary of Kythal, and thence to Hissár, the bed has become so choked, that it is scarcely discernible; since which time, the inhabitants of those parts have become parched with thirst(c), and their gardens dried up.

“Now that I have given the district (Sarkár) of Hissár to the great, the fortunate, the obedient, the pearl of the sea of my kingdom, the star of my government, the praised of the inhabitants of the sea and land, the apple of my kingdom's eye, my son Sultán Muhamad Salím Bahádur(d), (may God grant him long life and greatness); my wisdom wishes that the hopes, like the fields of those thirsty people, may, by the showers of liberality and kindness, be made green and flourishing,

(a) “The similitude of those who lay out their substance, for advancing the religion of God, is as a grain of corn which produceeth seven ears, and in each ear a hundred grains.”—*Sale's Korán, Ch. II.*

(b) Sádhaura, a town of the Ambálá district, about twenty miles west of the Jumna. The river flowing past Sádhaura is the Markanda, but the sources of the Chitang are only seven or eight miles distant.

(c) In Hariáná the springs have been raised, since the canal was re-opened, in some instances as much as sixty feet.—Capt. Baker's Report on the Sutlej and Jumna Canal.

(d) Afterwards the Emperor Jahángír, who was at this time under two years of age. “The Sirkár of Hissár Fírozeh, ever since the conquest of Hindoostan by the Moguls, has constituted the personal estate of the heir apparent of the empire”—*Rennel.*

and that the canal may, in my time, be renewed, and that by conducting other waters into it, it may endure for ages.

“ For God has said, from water all things were made. I consequently ordain, that this jungle, in which subsistence is obtained with thirst, be converted into a place of comfort, free from that evil.

“ Consequently, in the year of the Hijra 977, my Farmán, bright as the sun, and obeyed by all the world, went forth ; that the waters of the nálás and streams at the foot of the hills at Khizrábád(e), which are collected in the Sonb river and flow into the Jumna, be brought by a canal, deep and wide, by the help of bunds, &c. into the Chitang Naddí, which is distant from that place about one hundred kos(f), and that the canal be excavated deeper and wider than formerly, so that all the waters may be available at the above mentioned cities, (Hansi and Hissár) by the year 978.

“ Behold the power of God, how he brings to life land that was dead(g).

“ Truly a canal is opened, and from the source to the mouth, although the zamindars and cultivators take by cuts abundance for their crops, it is still sufficient to meet the demand.

“ Because this canal was renewed for the sake of my beloved son, in compliment to him, whom, in his childhood, I call *Shekho*, and because in Hindustani a canal is called *Nai*, I have called this canal the *Shaikh Nai(h)*.

“ And whereas Muhamad Khán Tarkhán was superintendent of this work from first to last, I have conferred upon him the office and title of Mír-áb.

[Here follows a flourish of the writer of the Sanad.]

“ The following verses have arisen from the ocean of my heart to the shores of my lips :

“ Muhamad Akbar Ghazí Jaláluddín.

“ He is the king of this age, and equal to king Jamshaid.

(e) Khizrábád, a Sikh town near the debouchement of the Jumna from the Hills, and the present Delhi Canal head.

(f) Dhátrat, where the present canal joins the Chitang, is by the line of the banks about 130 miles (pretty exactly 100 kos of the country) from Khizrábád.

(g) God sendeth down water from Heaven, and causeth the Earth to revive, after it hath been dead.—*Sale's Korán, Ch. XVI.*

(h) This title appears to have been very short lived. I am not aware that the word *Nai* is now applied in this sense in any of our canal districts, but I learn that it is the Panjábí corruption of *Naddí*, and is commonly applied by the Sikhs to a river or water-course. The valley of the Ghagar is called *Naili*.

“ His throne is the throne of Farídún and Kai.

“ He is like unto Khizr, and from the waters of his generosity every thing has life.

“ He is such a king, that from the canal of his liberality, the garden of the world is green all the year round.

“ A canal by his orders was carried to Hissár ;

“ For the sake of the Prince Salím of blessed steps.

“ A canal like milk, and that milk full of fish ;

“ Its waters like honey, and pleasanter than wine.

“ The king in his great kindness gave Muhamad Salím the title of Shekho, because his Pír (spiritual patron) was a Shaikh(i).

“ He consequently called this canal Shaikh Nai.

“ May the Bádsháh and Prince live for ever.

“ The date of excavating this canal is to be found in the following words :—

ابادىخ ني (j)

“ Tarkhán obtained the title of Mír-áb for his labours, because he carried the waters of the canal in every direction.

“ As long as the new moon, like a boat, sails in the waters of the blue heavens, so long may the waters of this king's generosity irrigate the garden of the world.

“ Whereas I have ordered that the waters be collected in this canal, and that it be made so wide and deep to Hissár, that boats may ply upon it in every part ; it is my will that the superintendent build bridges and bunds wherever necessary(k), that at the season of cultivation a sufficient supply of water be given to all who aided in excavating the canal, and they obtain water all the year round.

(i) It is said that Akbar having had no child who survived infancy, made a pilgrimage to offer his prayers for posterity at the shrine of Mugnúddin Chishtfat, Ajmir. He was there directed to seek the intercession of the Shaikh Salfm Chishtfa Sfrkf; and shortly afterwards the favourite Sultana was delivered of a son, who in honour of the saint was called *Shekho Salim*. A village on the canal near Hissár bears the name of Salfma Shekhopoor.

ا ب د ش ي خ ن ي (j)

(k) The only old bridges now existing between the canal head and Hansi are, that called the Gharaunda bridge, near Karnal, and one at Safidan ; both massive structures with pointed arches.

“ Also, that on both sides of the canal down to Hissár, trees of every description, both for shade and blossom, be planted (*l*), so as to make it like the canal under the tree in Paradise, and that the sweet flavour of the rare fruits may reach the mouth of every one, and that from these luxuries a voice may go forth to travellers, calling them to rest in the cities where their every want will be supplied, and I trust that, from the blessing attending this charity, the garden of goodness may remain ever green, that the benefits of the blessing may be incalculable, and that from it, I may obtain eternal reward.

“ Thanks be to God who has enabled me to do this, which, without his instruction, I should not have performed.

“ It is necessary that every one acknowledge the person appointed to this work, and recognize no partner with him.

“ Should it be necessary to construct a bund, or any other work on the canal, all Shikkdars (*m*), Chaudrís, Mukaddams, and Rayats, whether of the Khalsa or of other Parganahs, will give the necessary assistance in labourers, &c. and delay not.

“ Every Parganah will be satisfied with the number of cuts made by the Mír-áb, and take no more, and on every occasion abide by his directions. He has the power to punish as he sees fit every one who takes water out of season ; whoever disobeys his orders will, after investigation, be punished as an example to others.

“ The superintendent is particularly cautioned to see that the cuts in every Parganah are equally and justly distributed, and in this matter to consider every one on an equality ; not to permit the strong to oppress the weak, and so to act as to please both God and man.

“ The inhabitants of both sides of the canal will abide by these orders, and obey all the high, enlightened, concise, &c. &c. farmans of the king.”



This document will be regarded as a very curious one by all who take interest in the past history, as well as in the present and prospective utility of the canals of Hindustan, suggesting as it does a fact which history appears to have forgotten, and which we have not ascertained

(*l*) Excepting a few of the different kinds of *Ficus*, scarcely any old trees now exist on the canal banks.

(*m*) *Shikkdár*, a revenue officer.

without some degree of pleasure, namely, that the Jumna canals, as a perennial source of supply to a thirsty land, owe their origin to the greatest of Indian princes.

The question, however, is a difficult one on account of the universal prevalence of the belief that Fíroz Sháh drew a canal from the Jumna to Hissár, and from the obscurity of the accounts of the various channels excavated by that king. The only books bearing on the subject to which I have access, are Dow's *Firishta*, and Rennel's *Memoir on the Map of India*.

The words of *Firishta* are as follows :—“ In the year 757, between the hills of Mendoulí and Sirmoor, he (Fíroz) cut a channel from the Jumna, which he divided into seven streams ; one of which he brought to Hansi, and from thence to Raeesen, where he built a strong castle, calling it by his own name. He drew, soon after, a canal from the Cagar, passing by the walls of Sirsutti, and joined it to the rivulet of Kera, upon which he built a city, named after him Fírozeabad. This city he watered by another canal from the Jumna.”(n)

The seven streams I cannot explain. “ Raeesen, (though this name is not now recognizable) where he built a strong castle, calling it by his own name,” is doubtless Hissar Fírozah, or “ the castle of Fíroz.” The remainder of the sentence seems almost inextricable from its obscurity, and probably, as Major Rennel suggests(o), contains a jumble, arising from the multitude of excavations made by King Fíroz, and the number of cities to which he gave his name. There appears, however, no reason to believe, according to Rennel's hypothesis, that a canal was ever brought to Delhi before the time of Sháh Jahán.

The *city of Sirsutti*, which Major Rennel is a little puzzled to fix, would seem to be *Sirsa*, for the following reasons—It was (Rennel

(n) Dow's *Firishta*, I. 305. A more exact translation than Dow's of the passages relating to the excavations of Fíroz, from a copy of *Firishta* in the palace library at Delhi, is given by Mr. Seton, Resident at Delhi, in a letter to Government, on the subject of restoring the canals, dated September 11th, 1807. But, in the words quoted, there is no material difference, except in the names of Hansi and Raeesen, which Dow writes *Hassi and Beraisen*. But the system of water carriage on the canals which Dow attributes to Fíroz in the following sentence, appears to be a mere embellishment.

(o) “ It may probably be a jumble of two sentences, which relate to different cities together. The river *Kera*, and *Fírozeabad* may relate to the city of Fírozepoor, at the conflux of the *Sutlege* and *Beyah*, and the canal from the *Jumna* to *Fírozeabad*, a city founded by Fíroz in the vicinity of old Delhi. * * * * Capt. Kirkpatrick notices an obscurity in the text of *Firishta* in this place.—*Rennel*, page 74.

p. 76) at the end of Timur's third march from Bhatner to Samána, and four marches distant from the latter place. Now *Sirsa* lies directly in the road from Bhatner to Samána; it is upwards of forty miles distant from the former and about eighty-five from the latter. This is easily reconcilable with the number of marches given, especially as two of these seven are stated to have amounted to 32 kos; which, if we take somewhat under 60 miles, the remaining five marches would average 14 miles each, and three such marches would just give the distance from Bhatner to Sirsa. Firishta also states that Timur having taken and pillaged the town of Battenize (Bhatner), and after that *Surusti*, advanced to Futtehabad(*p*). This seems to fix the identity of Sirsutti with Sirsa. But again, Ibn Batuta relates, that on his journey from Multán to Dehli, after travelling four days from Ajúdahan, he arrived at the city of Sirsutti, a large place abounding in rice, which was carried thence to Dehli. And from Sirsutti he proceeded to Hansi(*q*). Now Sirsa is about 100 miles distant from Ajodin, (or Pák Patan) on the Gharra, in the direct line towards Hansi. And the rich valley of the Ghagar might well supply the abundant rice crops.

The canal then which Fíroz drew from the Ghagar under the walls of Sirsutti, is in all probability the Choya nálá, which issues from the Ghagar near Múnak, passes close to Sirsa, and bears evident traces of having been partially, at least, an excavated channel(*r*). The mention of its junction with "the rivulet of Kera" is indeed unintelligible. The nálá in fact joins the Ghagar again, not far from Sirsa, and a short distance below their union, the Revenue map shows a village called Fírozabad. I should be curious to know if at this village exist any remains of greatness, from which we might suppose it to be the city alluded to by Firishta.

The remainder of the sentence we must leave alone. Hissár Fírozah might indeed have been watered by a canal from the Ghagar as well as from the Jumna(*s*), but certainly not by a canal from the Ghagar passing under the walls of Sirsutti or Sirsa.

(*p*) Dow II. p. 4.

(*q*) Ibn Batuta, p. 110.

(*r*) See Capt. Baker's printed report on the Ghagar.

(*s*) And probably was. For the late Major Brown traced an old channel from the vicinity of the Ghagar, in the direction of Hissár. This, however, the natives called an old bed of the Sirsutti river. But the Sirsutti has a gift of ubiquity!

Major Rennel's words with regard to the Hissár canals are as follows : " It appears that previous to the building of Hissár, Fíroz had made a canal from the Jumna, near the northern hills, to Safidún a royal hunting place ; for the purpose of supplying it with water. This canal was in length 30 royal cosses or full 60 G. miles ; and it passed by Karnál and Toghlukpoor. After the foundations of Hissár were laid, he drew two principal canals to it ; one of which was a prolongation of the canal of Safidún, the whole extent of which was then 80 (common) cosses, or about 114 G. miles. The other principal canal was drawn from the Sutlege river to Hissár Fírozabad. The outlet and course of this canal is not so clearly defined as the other : Capt. Kirkpatrick, to whom I am indebted for the information concerning Hissár and its canals, had it from a history of Fíroze written by *Shumse Seraje*, soon after the death of that great monarch which happened in 1388."

With regard to this Sutlege canal to Hissár Fírozah having ever been successfully executed, we may feel sceptical. The only line within possibility would be from the neighbourhood of Rupar to the Sirhind nála, and thence crossing the Ghagar into the Hissár district, according to the general line sketched by Capt. Baker in 1841. But leaving this and turning to the Safidún canal, we remark that in Hodgson and Herbert's map, a branch of the Chitang is represented as quitting the main channel and passing within a short distance of Safidún(*t*). And this, guided by the *Sanad* before us, we might suppose to be the original canal of Fíroz, were not the statement so distinct that his canal was drawn from the Jumna. Toghlukpúr I have no knowledge of, but the mention of Karnál points to the existing line of canal, as the Chitang is ten miles distant from that city. It is difficult to doubt this evidence, and yet it is almost equally difficult to throw overboard the clear statement of Akbar's *Sanad*. It is indeed possible that Fíroz may have connected the Chitang at a much higher point of its course with the Jumna, by a cut which could only convey a supply of water into the nála when the river was at high levels ; or that a canal from the Jumna was by Fíroz Sháh attempted unsuccessfully, upon which recourse was had to the

(*t*) " Of this branch all I am aware of is, that in seasons heavy of rain great floods pour into the canal near Barod, said to be consequent on the destruction of the earthen dams of the Chitang.—*Col. Colvin in J. A. S. II.* 106.

temporary supply derivable from the Chitang, and as the latter flows for sixty miles almost parallel to the Jumna and at no great distance from it, a misrepresentation thus arose. Otherwise we can only suppose that Akbar, in self-glorification, falsely represented his own renewal and repair of his predecessor's work, as an original enterprize of his own.

Singularly enough the *Sanad* itself does not speak of the new canal having been fed from the Jumna, but "from the *nálás* and streams at the foot of hills which are collected in the Sonb river and flow into the Jumna." But the Emperor speaks of his canal as capable of supplying water all the year round, and the Jumna is the only accessible source of such a supply. Doubtless then as now, the supply of water *crossed* the Sonb, that is, flowed *into* it and again *out* of it, so that the canal might with truth be said, to be drawn from *nálás* collected in the Sonb.

It is certainly somewhat singular that Firishta, who flourished in the latter part of Akbar's reign, and has made prominent mention of the ancient excavations of Fíroz, should not have alluded to this work. But the historian residing in the Deccan had probably no personal knowledge of the work, whilst contemporary documents would be less accessible than those relating to past times. It is true also that the Hansi canal is still known universally as the Canal of Fíroz, and the name fondly bestowed by Akbar in honour of his infant heir has been utterly forgotten(*u*). But new names always adhere loosely among the many: *Dehli* and *Agra* are likely to outlive the remembrance of *Sháhjáhánábád* and *Akbarábád*, and though the canals have had as many names as a Parisian *place* during the Revolution(*v*), yet *Nahr Fírozah*, the first name known to the people, keeps its place in their mouths.

There seems no good reason to doubt the genuineness of the *Sanad*. It is dated in the month of Shawál A. H. 978, from Fírozpúr in the Súbah of Lahaur. Now it appears from Firishta, that Akbar, on the

(*u*) Akbar appears to have been particularly fond of this kind of nomenclature. He called the new Súbah of Kandísh *Dándísh*, after his son Daniel.—(*Rennel*.)

(*v*) Some of these names are—

Nahr Fírozah.

Shaikh Nai.

Nahr Bihisht.

Fyz Nahr.

Sháh Nahr.

birth of his son Murád, in the first month of 978, went on a pilgrimage to the shrine of Muyínuddín at Ajmír, thence by way of Nagor and Ajodín on the Sutluj to Lahaur, which he quitted for Ajmír and Agra in the second month of 979. So that he might well have been at Fírozpúr on the date given.

It is easy to conceive how the canals fell into decay. In the decline of the imperial power, when the irrigated country was a seat of constant war, and the lands along the banks were alienated among various chiefs, any system of conservancy became impossible, and the works must rapidly have been ruined. The Hansi canal was the first to suffer, as early as 1707, we are told(*w*), the Sikhs taking advantage of the weakness of government during the contentions of Aurang Zeb's sons for the empire, converted the whole of the canal waters to their own use. And this at once reducing the country around Hissár to its original sterility, forced almost the whole of the inhabitants to seek a more favourable soil. A hundred years afterwards, in 1807 (as we are told by an officer on Survey in the Sikh States at that time), there was not a single inhabitant in the extensive city of Hissár(*x*). The Dehli canal, or Ali Mardán Khan's branch, continued to flow to a much later period. The officer just referred to learned, from aged zamindars, that the country had been deprived of the advantages of this canal since the accession of Alamgír II. in 1753. The same authority informed him that for purposes of canal police, and the ready repair of accidents, a Darogha was stationed at every three or four koss, with peons and beldárs under him. The water rent appears to have been regulated by the time that the outlets remained open. 1000 armed peons and 500 horse, as Mr. Seton was informed by the son of one of the last native superintendents(*y*) were maintained on the establishment. According to a proverbial expression current at Dehli, the net revenue from the canals was reckoned equal to the maintenance of 12,000 horse(*z*).

As Colonel Colvin's paper on the history of the canals contains few dates, it may be worth while to add the following :—

(*w*) Letter dated May 1807, from Lieut. F. White, Surveyor to the Resident at Dehli. In the Office of the G. G. A. N. W. F.

(*x*) Ditto ditto.

(*y*) Letter from Mr. Seton to Govt. 11th September, 1807.

(*z*) Ditto ditto.

Chronology of the Western Jumna Canals.

A. D. 1351.—Fíroz Sháh brought a stream down the channel of the Chitang to Hansi and Hissár.

About 1468.—The waters of the above named channel ceased to flow further than the lands of Kythal.

A. D. 1568.—Akbar re-excavated the work of Fíroz and brought a supply from the Jumna and Sonb, by the present line, into the Chitang.

About 1626.—From the last named line, Ali Mardán Khán drew a canal to Dehli; first by way of Goháná, and afterwards, on that failing, by the present channel, passing near Paniput and Soneput.

A. D. 1707.—The water ceased to reach Hariána.

„ 1740.—Ceased to flow at Safidún.

„ 1753 }
to } The Dehli branch ceased to flow.
„ 1760 }

„ 1817.—Capt. Blane appointed to restore the Dehli Canal.

„ 1820.—The water again entered Dehli.

„ 1823.—Restoration of Fíroz's, or the Hansi branch commenced.

„ 1825.—The water turned down.

Simla : November 1st, 1845.

P. S.—Capt. Abbott having, since the above was written, furnished me with a copy of the original Persian of the Sanad, it is enclosed. I have also since ascertained that the Ayin Akberi makes no mention of Akbar's having engaged in this work, which is singular.

*Notes, chiefly Geological, on the Western Coast of South India.**By Capt. NEWBOLD.*

I have not yet had an opportunity of examining the Western Coast from Cape Comorin to Bellore, but by specimens received thence, and by information from General Cullen, laterite is doubtless the prevalent surface rock. General Cullen writes me that he has found a bed of lignite, in the laterite at Karkully, about fifteen miles south of Quilon, in a stratum of dark shales and clays. At Cape Comorin itself are beds of sandstone, and shell limestone, of which a good account is a desideratum.

Calicut.—At Calicut, the ancient capital of the Zamorin, (a corruption by the Portuguese for Raja Samudri) and the landing place of Albuquerque on the shores of India, laterite is also the prevalent rock.

The modern town exhibits few traces of this once famous city. Of the old fort scarcely a vestige remains beyond a ruined doorway, the traces of a fosse and counterscarp, some mounds marking the southern gateway, and the site of a few bastions.

Another fort, it is said, was built by Tipoo; but this too has been destroyed; and the present shoal of Calicut was pointed out to me by an old native as the site of a still older fort overwhelmed by the sea. Tradition states that the place where the Syrians landed near Quilon is also engulfed.*

The modern town is a large assemblage of garden houses, on a low sandy sea coast, under a grove of cocoanut and jack trees, and extending a considerable distance inland. A broad street runs down to the sea through the midst of this scattered town. The houses flanking it are usually contiguous, built of laterite, or brick and chunam, whitewashed.

The streets, that branch off from it to the right and left, are narrow, winding, and dirty, like those in the oldest parts of Lisbon. Here dwell the Moplay and other native merchants.

On the beach facing the sea runs a row of warehouses for timber, coir rope, split bamboos and other marine stores. The rope is manufactured on the spot.

* Madras Journal, No. 30, p. 146.

In the roadstead I observed native craft only. The boats used for communication with the shore, though composed of planks sewn together with coir, like the Massoolah boats at Madras, differ from them in being lighter, lower, and flat-bottomed, and are extremely pointed at the stem and stern. As the surf here is much less powerful than on the Coromandel Coast, a boat of a heavier description is not required.

The laterite continues, by Mahé and Tellicherry, to Cannanore, a little north of which it overlies some carbonaceous looking clay, and slate clay. Lateritic iron ore is found at Augadipur, Satimangalum, and many other places throughout Malabar; iron sand (magnetic) in most of the ghaut streams. Gold dust is also found in similar localities, especially in Wynaad and Ernaad, and other places elsewhere specified.

Payengady.—Payengady is about sixteen miles NNW. from Cannanore, and stands on the sea coast near a back water. A *coup d'œil* from the rising ground near the village presents a low flat, stretching between an inland ridge and the sea; and which has all the appearance of having been covered by the sea up to the base of the laterite cliffs. This flat is for the most part covered by marine sand, and thinly scattered with houses shaded by cocoanuts. A few marine shells were found at the base of the cliffs about a mile inland. Whether drifted by the wind or conveyed here by the sea under former conditions is uncertain.

The hills in the back ground stretch out like promontories, terminating abruptly at the inland edge of the flat.

The laterite overlies granitic and hypogene rocks. Between Covai and Cautcutcherry the Nelisir back water is crossed from Malabar to Circar Canara, or from Malayala to Tuluva, where Canarese is spoken and Malayalum ceases.

Cassergode.—The laterite continues the surface rock by Hosdroog, Bekul, and Chundergherry, to Cassergode. It rests as usual on granitic and hypogene rocks; which, near Bekul, are veined with quartz, and imbed garnets and amethystine quartz, fragments of which are numerous in the sand on the shore. There is also a black magnetic iron sand derived probably from the dark and beautifully crystalline hornblende schists. The strike of strata is westerly: the dip is confused, often vertical. The fort stands on laterite, capping basaltic greenstone.

The soil on the rice flats is a rich mould, deposited in part by the rivers in their passage to the sea from the ghauts. These bring down a considerable portion of the decayed vegetable matter of the dense jungles on their banks, mingled with the detritus of granitic hypogene rocks, and of the laterite. When lateritic detritus is in excess, vegetable matter is added by the natives as a manure. Inland, to the NE., the granitic masses of Jumalabad, Murbiddry, and Carculla rise above the surface, the former to a great height, almost inaccessible from the steepness of its sides.

Mangalore.—Laterite is still the surface rock as before observed. The numerous back waters or marine lagoons, which lie along the Malabar Coast, are formed at the mouths of rivers by sand bars thrown up by the antagonizing forces of the mountain torrents and the tidal wave. These sand bars are liable to be broken through, and alter their position by the force of extraordinary storms. Their beds afford instructive examples of the manner in which both fresh water and marine exuviae may be mingled and embedded in the same stratum. Numerous sand dunes also occur at the embouchures of rivers near back waters. These tranquil marine lagoons greatly facilitate native commerce along the coast.

Kundapur.—About a mile inland from the present embouchure of the Kundapur river, stands the town of Barcelore, the supposed Barace of Ptolemy: a place of great traffic in former times with Arabia and Egypt, and which is supposed to have stood upon the old embouchure of the river before the land gained upon the sea.

Vicramaditya, or his dynasty, is said to have ruled 2,000 years at Barcoor (Barcelore), and, after him Salivahana, to whom succeeded Buddha Penta Raja and the Bijanuggger dynasty. A human sacrifice, offered up to increase its commerce, is alluded to in the Mackenzie MSS.

I observed near the old Pagoda at Kundapur, an inscription on stone, which opportunity did not permit me to copy. Barcelore is still a place of great native trade.

The present bar at the river's mouth does not admit vessels of more than fifty or sixty corges, which find secure anchorage under the lee of the north bank. Its entrance was protected by a battery built by Hyder, and an old fort now in ruins.

Honawer (Onore) and Sedashegur.—The geology of Honawer, or Onore, has already been touched upon. Suffice it to say, that laterite is the prevalent rock.

Sedashegur is about 168½ miles, northerly from Mangalore, about three miles south of the southern frontier of the Portuguese territory of Goa. The western ghauts here advance boldly to the ocean and afford some points of view, which truly approach the magnificent. The back ground of the picture is filled with the wild mountain scenery of the ghauts, from whose forests issues the Kali, or Black River, to the Indian Sea in the fore ground, expanding into a broad and beautiful lake near its embouchure, and stretching between two bold promontories, the northernmost of which is crowned by the picturesque ruins of the old fort which once guarded the entrance.

Across the mouth of the river runs a sand bar, over which at high water there is a draught of about two and three-quarter fathoms. Vessels of about forty corges find a snug anchorage within the bar; and boats of from twenty to twenty-five corges pass up the river eighteen miles to Mallapur, where there is a salt depôt. They carry up salt-fish and salt from Gokurn, and bring back rice and firewood, chiefly for the Goa and Bombay markets. Mr. Oakes attempted to make this a depôt for the cotton shipped from the interior to Bombay, &c., as being a much more convenient harbour, and nearer Bombay than that of Kompta. But the project failed in consequence of the opposition of the Gujerati merchants of Kompta, who were averse to quitting their Mamool village.

The formation of the ghauts near Sedashegur to the south, is chiefly granite with gneiss and hornblende schist, penetrated often by large dykes of basaltic greenstone, which at their base are covered partially by laterite. Their summits, I had no opportunity of examining.

A little south of Sedashegur, between Ancola and Chendaya, the beach of a small and pretty indentation of the sea is strewed with nodules of a stiff black clay, resembling in colour that of the lignite deposit at Beypoor: the situs cannot be very far distant. Iron is said to be smelted at Gopchatta.

The soil is usually a sandy loam. The staple articles of cultivation are rice, cocoanuts, sugarcane and raggi. The latter and hill-rice

occupy the dry lands and cleared sides of the mountains (like the wheat on the high *sierras* of Spain,) while the irrigated flats of the valleys smile with abundant crops of paddy and sugar-cane. Yearly the mountains blaze with the fires of the clearers, who are obliged, like the Malays, to shift from one spot to another as the soil of the clearing becomes exhausted.

The fort, it is said, was built by the Sodaj Rajas of Sirey, from whom the Portuguese wrested it. It next fell with Ancola and Gokurn into the hands of Hyder, and eventually into those of the English.

I observed about thirty-two guns, apparently of Portuguese manufacture, lying about.

At present (1840), Sedashegur (Siveswargur) contains about 600 houses, inhabited principally by Concani Mahrattas engaged in cultivation, by Christians from Goa, Comarapaiks, and Mussulmans. Three miles north commences the *Konkana* region, where that of *Tuluva* terminates. Near the junction, the two languages, viz. Canarese and Mahratta, are mixed. The old inscriptions on stone at Gokurn and other places south of this, are mostly in the old Canarese language and character. Some of the earlier ones belonging to the ninth century of the Salivahana era, show that this part of the country was under the sway of the kings of the Cadumba dynasty of Bunwassi; and those of the fifteenth century show the extension of the Bijanugger empire to the western coast.

Gokurn, about thirty miles south of Sedashegur, is one of the sacred places of Hindu pilgrimage, ranking with Tripati, Ramisseram, Jugernath, Sondur and Sri Sailam or Perwut.

It is the reputed scene of Parasuram's exploits, who raised the whole of the western coast from the ocean's bed to the base of the ghauts, and divided the new born territory among the Brahmans. Many subdivisions of this tract, and other changes, are known to have taken place at various historical epochs; for instance, the tract from Honawer to Gokurn was called *Haiga*; but it is probable the three provinces as they now exist, viz. the Concan, (or *Konkana*); Canara (or *Tuluva*); Malabar or Travancore (or *Kerala*), distinguished by the Mahratta, Canarese, and Malayalum languages, were the original geographical and political divisions of the western coast of India. After descending the ghauts,

with the physical aspect of the country, the vegetable, animal, and social systems undergo a striking change. A new language strikes the ear, and the eye is astonished at the sight of the wives and daughters of the upper classes, walking abroad naked from the waist upwards. The houses of towns and villages, instead of being huddled together as in the Carnatic, are widely separated in gardens or *desams* like the Malay Campong, and the generality of inhabitants struck me as resembling Malays in their habits and customs. The singular right of inheritance enjoyed by the sister's son is precisely similar to that of the Menangcabowe Malays. Sheep are no longer seen, and instead of the fine oxen of Coimbatore, one sees a miserable breed of black cattle, hardly larger than donkies. The peculiar manners and customs of the various castes are too various for detail here.

Goa and Malwan.—Laterite covering granite and the hypogene rocks, continues from Sedashegur to Goa, and probably from Goa by Vingorla to the north of Malwan.

At Malwan gneiss occurs, and a bright magnetic iron ore, resembling that of Salem, disseminated in grains and nests, or in alternate layers with quartz. The rocks off the coast, washed by the breakers from their white colour and shape have the appearance of a boat under sail.

Mr. Fraser describes the overlying trap as coming down to Malwan, but I did not meet with it on the coast till I reached the village of Sarki.

Sarki.—I had no opportunity of examining the rocks at Ratnagherry, which lies between Malwan and Sarki: but the contour of the ghauts here is apparently trappean. At Sarki the trap hills descend towards the coast in long, flat-topped, wall-like promontories, becoming higher and wilder around Severndroog.

Bancoot or Fort Victoria.—The trap rises from the sea beach in a high steep rock, on the western extremity of which stands the fort commanding the entrance of the river. The citadel and flag-staff are conspicuous objects at sea. The town extends, at the base of the rock, towards the sea, and is well studded by cocoanut trees.

The rocks in the little bay of Shiwurdin are dark basalt and amygdaloid, imbedding zeolites, geodes and veins of chalcedony and quartz. At the water's edge the basalt is much honeycombed.

The outline of the ghauts in the back ground is bold and picturesque. A little to the north, the mountains of overlying trap attain their maximum elevation, which never approaches that of the peaks of granite and hypogene schist farther south, although they sometimes attain 4,500 feet of altitude above the sea's level.

They usually rise from the low maritime tracts of the Concan in bold escarpments, broken by steps or terraces, to the table land of the Deccan.

The Concan.—The foregoing observations from Goa were made as I was sailing up the coast from Sedashegur in a native pattamar, with a foul wind to Bombay. After leaving Fort Victoria the wind became fair, and consequently I had no longer any opportunity of going ashore and examining the Concan between Bombay and Bancock. The ghauts in this region, we know, are of trap from the observations of Colonel Sykes. Their long horizontal outline, varied occasionally by truncated conoidal peaks, are characters in which their nature is plainly written.

The rock composing the Concan is chiefly trap. My lamented friend Malcolmson found beds of sandstone at Atchera, dipping at a considerable angle to the NW.

As the existence of fossiliferous deposits is by no means improbable on this low maritime tract, through the rocky fissures of which many hot springs find vent, and which have not yet been fully examined, I should strongly recommend its minute geological exploration.

Bombay.—The geology of this and the neighbouring beautiful islets of Elephanta, Salsette, &c. has been so well and minutely described by Dr. Thomson, that I shall content myself with observing that they are all of the overlying trap formation, and the rocks composing them embrace every variety from dark basalt to light coloured amygdaloids and wackes, from compact to crystalline and porphyritic.

I must not however omit to mention a curious variety termed *white basalt*, of which the base of Sir John Malcolm's statue at Bombay, if I recollect right, is composed. Externally it often resembles a soft felspathic granular sandstone, white, with a slight shade of yellow, but it is clearly seen passing into a true, rough, crystalline trachyte.

It is dug at the quarries of Salsette, and composes a large part of the island; some of the granular varieties are extremely hard, and

take a fine polish. Crystals of glassy felspar occur imbedded when the rock passes into trachyte porphyry; but I have never seen it with scales of mica, assimilating granite, like the trachytes of Smyrna and Mitylene. In some places it has the appearance of a stratified sandstone, and in others there can be no doubt of its volcanic origin. In one place it is felspathic; in the other imbedding rock crystal, and *globules* of quartz.

As this curious rock is without parallel in India, a detailed description of its relations with the contiguous trap, and a series of specimens exhibiting the different mineral alterations the rock undergoes in various parts of its mass from the line of contact to its most distant point from the trap, would be highly interesting and instructive. It is probable that the molten mass of trap and trachyte may have here invaded the sandy bed of a lake or sea, and thus become blended.

The amygdaloid of Bombay, among other beautiful specimens of the zeolite family, contains that rather rare mineral (in Europe), apophyllite. Chalcedony in most of its varieties, and beautiful agates, are common.

The temperature of sea water in the harbour of Bombay in April was 87° Fahr. a foot below the surface. The temperature of air in the shade was 85° the time of observation 3 P. M.

The temperature of water in a well at Bombay, 20 feet deep, was 82° ; (which approaches the mean temperature of the place): the temperature of air in the shade was 86° ; time, noon; month, April. The temperature of the cave of Elephanta—same month—time, noon—was 85° ; the temperature of the water of a well in Elephanta was 75° . 5'—temperature of air in the shade at the moment was 85° ; time of observation, noon.

*The Coins of Arakan :—The Historical Coins, by Capt. A. P. PHAYRE,
Principal Asst. Commr. Arakan.*

The art of coining appears to have been introduced among the Arakanese only at a very late period. Their oldest legendary coins were suggested to them by the coined money of the Mahumudan sovereigns of Bengal. I say their *legendary* coins, since it is probable that a medal similar to that described, and so happily explained by Lieut. Latter (in the Jour. As. Soc. Vol. XIII. p. 571) was struck in Arakan at a period much earlier than were the coins now to be noticed. It is indeed certain, that to coin money is a but lately known art among the Burmese race. The term in their language for coin,—*ding-ga*,—seems not to be a native word, but adopted from the Hindooee, *tu-ka*. In the dominions of Ava, coined money is still unknown; payments are made by silver ingots weighed out as required.

The Arakanese sovereigns no doubt wished to follow the kingly practice existing in Bengal, of coins being struck in the name of the reigning monarch. We learn from their annals that about the middle of the fifteenth century of the Christian era, they conquered Bengal as far as Chittagong, of which they kept possession for about a century. It was then, that they first struck legendary coins. On the obverse of the earliest of these, we find the date and the king's names written in the Burmese character, together with barbarous attempts at Mahumudan names and titles; these they assumed as being successors of Mussulman kings, or as being anxious to imitate the prevailing fashion of India. Indeed, there is some reason to believe that *Ba-tsau-phyú*, a Búddhist king like the rest, who ascended the throne A. D. 1459, obtained among his own subjects the epithet *kalamashá*, (the son of the *Kalama*) from having issued a coin with the Mahumudan *kulima* inscribed upon it. The reverse of most of the earlier coins, contains unintelligible Persian and Nagri inscriptions. The Arakanese kings were frequently known to their subjects by names and titles different from those which appear on their coins. This circumstance will explain a discrepancy observable between the coin-names of kings given here, and the sovereigns of the same period found in the list of Arakanese kings, published in the Society's Jour. Vol. XIII. page 50. The coin-date generally coincides with the year of the king's

accession to the throne ; but in some instances it does not : more than one coinage having occasionally been issued in the same reign.

Old coins are frequently discovered buried in the ground in various parts of Arakan. Several valuable ones thus found have been kindly sent me by Major David Williams, Principal Assistant Commissioner (then) of Ramrec. Many have also been met with, hung as charms or ornaments round children's necks, which have been retained in families for several generations. At present I have the means of describing only a few of those I once possessed ; the greater portion having been lost when the Society's cabinet was robbed some months ago. All those now described are of silver, for though a few of mixed metal are to be met with, their legends do not differ from these.

The oldest Arakanese coin I now possess is that marked No. 1. The obverse is as follows :—

၆၆၃ ဆင်ဖြူ သခင် နရပိဗ္ဗတိဆောလိင်သျှာ

TRANSLATION.

963. *Lord of the White Elephant, Nará-dib-ba-di Tshau-lim Shyá.*

Here 963 in the Arakanese era is equivalent to A. D. 1601. *Nará-dib-ba-di* is a Pali title signifying I believe "Ruler of men ;" while *Tshaulim Shyá*, is nothing more than a barbarous attempt at the Mahumudan title *Zalim Shah* ! The reverse of this coin bears some unintelligible compound of Persian and Nagri letters. The above king stands No. 17 in the list of Arakanese sovereigns of the *Myouk-ú* dynasty, in the Jour. As. Soc. 1844, p. 50, under the name of *Meng-Rá-dzá-gyi*. I long considered the date of this coin to be 863, the first figure on that I possess being imperfect, and the date 863 corresponding with the accession of a king styled *Meng Rá-dzá* in the above mentioned list No. 8. However, on seeing a duplicate of this coin in the possession of Lieutenant Fytche, I was struck with the resemblance of the first figure to a 9 and looking into the *Rá-dzá-weng* or Arakanese history, I found *Meng-Rá-dzá-gyi* mentioned with the Pali and Mahumudan titles (the latter differing slightly in the spelling) as inscribed on the coin. The coin must have been struck in the eighth year of his reign.

No. 2. The next coin is that of the son and successor of the preceding king; the obverse bears the following date and inscription:—

၉၇၄ ဆင်ဖြူ သခင် ဝရေဓမ္မရာဇာ ဥဒ္ဓျောင်သျှာ

TRANSLATION.

974. *Lord of the White Elephant, Wa-ra-dham-ma Rá-dzá Oo-shyounge-shya.*

This date is equivalent to A. D. 1612. *Wa-ra-dham-ma Rá-dzá* is a Pali title said to signify “Excellent-law-observing king;” while in *Oo-shyounge-shya* we have another instance of the barbarous adoption of a Mahumudan name, it appearing to stand for Hoosein Shah! This king was commonly known to his subjects by the name *Meng khamoung*.* The reverse of this coin bears like the preceding one an illegible inscription in Persian and Nagree.

No. 3. The obverse of this coin has the following date and inscription:—

၉၈၄ ဆင်ဖြူ သခင် ဆင်နီ သခင် သိရိသုဓမ္မရာဇာ

TRANSLATION.

984. *Lord of the White Elephant, Lord of the Red Elephant, Thi-ri-thu-dham-ma Rá-dzá.*

This date is equivalent to A. D. 1622. There is no Mahumudan name on this coin. The Pali title is translated “Excellent righteous king.” On the reverse is an illegible Persian and Nagree inscription.

No. 4. This coin, and all those posterior to it, have the same inscription on the obverse and reverse. On this one the date and inscription are as follows:—

၁၀၀၀ ဆင်ဖြူ သခင် ဆင်နီ သခင် နာရာဇာဓိပတိ

TRANSLATION.

1000. *Lord of the White Elephant, Lord of the Red Elephant, Na-ra-ba-di-gyi.*

This date answers to A. D. 1638, the very year in which the History of Bengal informs us that the “Mugh Chief who held Chittagong on the

* *Khamoung*, in Burmese writings signifies, the “canopy of state”—being part of the regalia of their Kings. It is probable that this title *Meng Khamoung*—was a translation of some Mahumudan epithet, which this King took to himself. It may be rendered, “The Canopy of Kings.”—T. L.

part of the Raja of Arakan," delivered it up to the Mogul Viceroy, Islam Khan. This circumstance accounts for the Persian inscription being wanting on this coin. This chief is called in the Bengalee History, Makut Ray, a corruption of his title *Meng-ré*, i. e. "War Chief."

No. 5. The date and inscription of this coin are as follows :—

၁၀၀၇ ဆင်နီ သခင် ဆင်ဖြူ သခင် သထိုက် မင်းတရား

TRANSLATION.

1007. *Lord of the Red Elephant, Lord of the White Elephant Tha-dó the monarch.**

This king does not appear to have been known by any other name than that here mentioned. The date is equivalent to A. D. 1645.

No. 6. Date and inscription are thus :—

၁၀၁၄ ရွှေနိန် သခင် စန္ဒသုဓမ္မရာဇာ

TRANSLATION.

1014. *Lord of the golden Palace, Tsan-da Thoo-dham-ma Rá-dzá.*

The date answers to A. D. 1652. The style of the king is here altered; he is no longer Lord of the White Elephant, but of the "golden Palace." This style was retained until the fall of the kingdom in A. D. 1784. The Pali title signifies "The moon-like righteous king."

No. 7. The obverse and reverse run thus :—

၁၀၄၇ ရွှေနိန် သခင် ဝရဓမ္မရာဇာ

TRANSLATION.

1047. *Lord of the golden Palace, Wa-ra-dham-ma Rá-dzá.*

This date is equivalent to A. D. 1685. In the list of Arakanese kings before referred to, the date of this monarch's accession is erroneously given as 1054.

No. 8. The date and inscription are as follows :—

၁၀၇၂ ရွှေနိန် သခင် စန္ဒဝိဇယာ

TRANSLATION.

1072. *Lord of the golden Palace, Tsan-da Wi-dza-yá.*

This date answers to A. D. 1710.

* The words *meng tará* might perhaps be interpreted "Lord of justice." Whilst *dhamma* generally refers in the Burmese Language to the "sacred law," *tará* alludes to the "law of the land."—T. L.

No. 9. Date and inscription.

၁၀၉၃ ရွှေနန်း သခင် စန္ဒသူရိယံရာဇာ

TRANSLATION.

1093. *Lord of the golden Palace, Tsan-da Thu-ri-ya Rá-dzá.*
This date answers to A. D. 1731.

No. 10. Date and inscription.

၁၀၉၉ ရွှေနန်း သခင် မဒရစ်ရာဇာ

TRANSLATION.

1099. *Lord of the golden Palace, Ma-da-rit Rá-dzá.*

No. 11. Date and inscription.

၁၁၀၄ ရွှေနန်း သခင် နရအာယရာဇာ

TRANSLATION.

1104. *Lord of the golden Palace, Na-ra-a-pa-ya Rá-dzá.*

No. 12. Date and inscription.

၁၁၂၃ ရွှေနန်း သခင် စန္ဒပရမရာဇာ

TRANSLATION.

1123. *Lord of the golden Palace, Tsan-da Pa-ra-ma Rá-dzá.*

No. 13. Date and inscription.

၁၁၂၆ ရွှေနန်း သခင် အာယမဟာရာဇာ

TRANSLATION.

1126. *Lord of the golden Palace, A-pa-ya Ma-há Rá-dzá.*

No. 14. Date and inscription.

၁၁၃၅ ရွှေနန်း သခင် စန္ဒသူမနရာဇာ

TRANSLATION.

1135. *Lord of the golden Palace, Tsan-da Thu-ma-na Rá-dzá.*

For this coin I am indebted to the kindness of Licutenant A. Fytche, Junior Assistant to the Commissioner of Arakan.

No. 15. Date and inscription.

၁၁၃၉ ၼွန်နီ သခင် စန္ဒသဒိသရာဇာ

TRANSLATION.

1139. *Lord of the golden Palace, Tsa-da-tha-di-tha Rá-dzá.*

No. 16. Date and inscription.

၁၁၄၀ ၼွပြည် သခင် ဓမ္မရာဇ်ရာဇာ

TRANSLATION.

1140. *Lord of the golden Land, Dham-ma-rit Rá-dzá.*

No. 17. Date and inscription.

၁၁၄၄ ၼွန်နီ သခင် မဟာသမတရာဇာ

TRANSLATION.

1144. *Lord of the golden Palace, Ma-há Tha-ma-da Rá-dzá.*

This was the last native sovereign of Arakan. In the second year of his reign being 1146 or A. D. 1784, the Burmese conquered the country. They immediately issued the next coin.

No. 18. Date and inscription.

၁၁၄၆ အမရပူရ ဆင်ဖြူများရှင်နိုင်ငံ

TRANSLATION.

1146. *Conquered country of the Amarapura, many-white-Elephant-Lord.*

This coin was also placed at my disposal by Lieutenant A. Fytche. During the forty years the Burmese held Arakan, they did not, I believe, issue a coin with any other date stamp upon it.

There is another coin which has been lent to me by Lieutenant Latter, and which should have come immediately after No. 9. I now mark it.

No. 19. Date and inscription.

၁၀၉၇ ၼွန်နီ သခင် နရပဝရရာဇာ

TRANSLATION.

1097. *Lord of the golden Palace, Na-ra-pa-wa-ra Rá-dzá.*

The date is equivalent to A. D. 1735.

The Coins of Arakan—The Symbolical Coins. By Lieut. THOS. LATTER.

The coins of which the accompanying facsimiles are given, are interesting, in that they represent whatever ideas they were intended to convey, by means of pure symbolism alone; and afford no clue by which to connect them with any particular prince. They are all, I believe, of a type peculiar to Trans-Gangetic India. No. 1, was found in the city of Haleng, in the Empire of Burmah, and has been already described at some length in a former number of the Society's Journal. It is placed here for the purpose of shewing how the same type of symbol runs through the whole. The remainder are peculiar to Arakan, the last being somewhat common. Knowing these coins to be Buddhistical from their being found only in localities—where no other than that faith has obtained, and having, as I have already said, no clue to justify our connecting them with any particular monarch; it is only by viewing them as representing by means of symbols certain dogmas, or tenets, (whether religious, or philosophical) of the Buddhist faith, that we can hope in any way to resolve their meaning.

In the description of No. 1, I speculated that the side (*b*) might be intended to convey a symbolical representation of the cosmology of Buddhism. The twenty-eight circular figures in the outer ring representing the twenty-eight Buddhs characteristic of a *Mahāgabbha*, or grand period of nature; and the five drop-shaped figures within the circle representing a *Buddhagabbha*, or lesser period of nature, the present period being characterized by the presence of five Buddhs; which are therefore made to preside over a curious emblem composed of certain triangles representing this world in particular. Although I could not at the time account for the reason why this singular combination should be able to convey such an idea; yet in a subsequent paper, (on the Buddhism of the emblems of architecture), I ventured to suppose (taking the triangles with their points downwards to represent "water;" and those with their apices upwards to typify "fire;" that their being made to meet in a circle, (the universe) with a point in it, (this earth) meant to convey the belief in the reiterated destruction of the world by fire and water, whence its Pali name *lauga*, from *lau*, "to be again and again" renovated and destroyed. It is singular that in the two coins, Nos. 2 and 3, my interpretation is indirectly corroborated, for in them

this emblem of "renovation and destruction," is conformably represented by the Bull *Nandi*, the peculiar cognizance of Shiva, the God of "destruction and renovation."

The two last coins are Shivite, but probably appertain to a time when the emblems of the worship of Shiva, and those of Buddhism had something in common. Struck perhaps by this similarity as well as by their novelty, they seem to have been adopted by some of the Princes of Arakan. The fact of the characters on them being Pali does not in any way militate against this supposition, as the Burman Alphabet is but a modification of the Pali, and the similarity of the two increases in proportion to the earliness of the date. We see on these coins the Buddhist triglyph represented by the trident of Shiva. On each side is a scroll; and beneath are certain round dots. These dots are curious, for they here occupy the same position in reference to the triglyph of Shiva, that the guttæ do to the triglyph of architecture. In three coins in my own possession, evidently of two different dies, their number is "five." In another from the collection of Capt. Phayre, figured No. 3, their number is "nine;" this last, however, is a peculiarly expressive and powerful number in Buddhism. The legend over the Bull varies in three coins, they are given separately, (*a. b. c.* No. 5.). (*c.*) presents the characteristics of the old Pali alphabet, with the exception of the first letter; I read it "*Shrī Vrieghau*, the last member of the symbol of the last vowel being effaced; so that it appears to the eye *Vrieghé*. The other two may be determined by those better versed in the old Nagri character. (*b.*) is of a more ancient type than (*a.*); which last is of the same class as the characters composing the inscription on the temple of Shiva in the village of Harshi, described in the Society's Journal, No. 43, July, 1835.

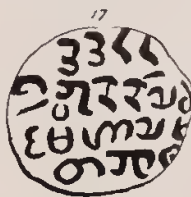
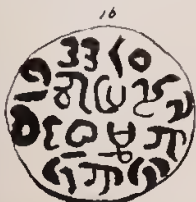
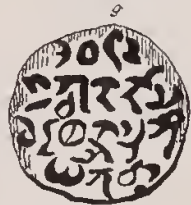
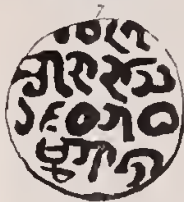
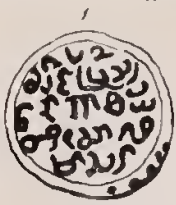
The popular tradition connected with these coins is the following: There was a king who set off to China to find the skull which he owned in a former state of existence when he was in the body of a dog; his astrologers having told him that this skull being wedged into the cleft of a tree was the reason why he was troubled with such incurable headaches, and that on removing it he would be cured. On his departure he left with his wife a ring, and told her that in case he should not come back in seven years, she was to raise to the throne, and marry

that one of her subjects whom it would fit. On his way back the daughter of the Ocean king who was in love with him, begged her father to raise a storm to drown his fleet, and thus procure her lover. This being done, the prime minister who escaped informed the queen of the death of her husband; she immediately gave out throughout her kingdom that he should be her husband whom this ring would fit. Though numbers tried, it was not till an herdsman from the hills with his brother and nephew came down, that it was found to fit any one. It fitted them all three, the queen married the eldest brother, who thus became king, and he, in commemoration of his origin, put an ox upon his coins, as also the goad (the trident), the implement of his craft.

The coin No. 4, is much more modern in appearance than any of the others. It would be impossible to determine its age, its appearance would not give it more than 100 years. It is evidently the handywork of an artist who has concocted together a quantity of symbols that most struck his fancy from coins of a more ancient date. On the side (*a*) we see the parasol roof; being a part of the *tsédya* emblems. On each side are figures appearing to guard it. Below is that flame-shaped symbol, mistaken by Marsden, if I remember right, for the conch of Vishnu. On the obverse (*b*) is the symbol of combined triangles, over which are three "Z" shaped figures.

No. 6. The coin No. 6, though not belonging to the country, is represented here, having been found on the sea shore of the Island of Ramree with several others. It is of gold, and thin. The central portion represents an animal like a pig, with the representation of the Bo-tree above, and a monographic character 8 beneath. Around are certain characters which an intelligent Buddhist priest declares to be old Cingalese, and to compose the words, "*Pawaraganran thooradza*," commencing from the letter marked (*a*). The first letter appears to have been mistaken by him; the first half composing it, being indistinct, appears to have escaped his attention. The name he gives is that of one of the old kings of Ceylon.

Historical Coins of Arakan.



J.W. Laidlay del.

हासयाटिक् सोसाइट् संस्कृत नागराक्षर ॥

महाभारतं आद्यन्त ४ खण्ड	...	...	४०
महाभारतीयान्तर्गतसूचीपत्रं आद्यन्त			
४ खण्ड	...	...	६
नैषध आद्यन्त सटीक् १ खण्ड	...	...	६
हरिवंश आद्यन्त १ खण्ड	...	...	५
राजतरङ्गिणी आद्यन्त १ खण्ड	...	...	५
सुश्रुत आद्यन्त २ खण्ड	...	...	८
सूची पुस्तकं १ खण्ड	...	...	१
लासनेन रचितं सर्व साधारण	...	...	४
गीतगोविन्द १ खण्ड	...	...	२॥
यज्ञदत्तवधः १ खण्ड	...	...	२२॥
शकुन्तला नाटक	...	...	१०

فهرست کتابهای عربی و فارسی مطبوع که در خانه اشیا تک
سوسیتهی حسب تفصیل الذیل بقیمتهای مناهب برای فروخت
موجود اند

اسامی کتب	قیمت
فتاوی عالمگیری مرتب بشش جلد فی جلد	هشت روپیه
عنایه جلد ثانی وثالث و رابع فی جلد	هشت روپیه ...
شرائع الاسلام	هشت روپیه ...
انیس المشرحین	پنج روپیه ...
جوامع علم ریاضی	چهار روپیه ...
اصطلاحات صوفیه	پنج روپیه ...
خزانة العلم	هشت روپیه ...
تاریخ نادری	هشت روپیه ...
فهرست کتب کالج فورت ولیم و اشیا تک سوسیتهی	یکروپیه

*Proceedings of the Anniversary Meeting held at the Society's Rooms,
on the 4TH MARCH, for the 7th January, 1846.*

The Rev. Dr. Hæberlin, in the chair.

The following gentlemen, proposed at the last meeting, were balloted for and declared duly elected :

Licut. T. C. Blagrave, 26th N. I. (Scinde).

Licut. C. C. Burton, 26th N. I. (Scinde).

The usual communications were ordered to be made to them.

The following new member was proposed :

J. T. Shave, Esq., proposed by S. G. T. Heatly, Esq., seconded by the Secretary.

The following gentlemen were elected as the Office-bearers of the Society for the ensuing year :

Vice-Presidents.—The Lord Bishop of Calcutta ; the Hon'ble Sir J. P. Grant ; the Hon'ble Sir H. W. Seton ; Lieut.-Colonel W. N. Forbes, and H. Torrens, Esq.

Secretary.—H. Torrens, Esq.

Librarian and Assistant-Secretary.—Babu Kissory Chand Mittra.

Committee of Papers.—The Rev. Dr. J. Hæberlin, W. P. Grant, Esq., C. Huffnagle, Esq., G. A. Bushby, Esq., W. Tayler, Esq., Babu Prosnocomar Tagore, S. G. T. Heatly, Esq., W. B. O'Shaughnessy, Esq., M. D., Lieut. A. Broome, B. H. A.

The proceedings for February, having been read, it was proposed by Colonel Forbes, that they be confirmed and published as respects the propositions put to the vote and carried in the latter portion of the proceedings, all else being recorded and not published.

Seconded by the Secretary.

The question was put to the vote and carried by a majority.

Read the following list of books, presented, purchased, and exchanged :

List of Books received for the Meeting of Wednesday, the 4th March, 1846.

PRESENTED.

1. Meteorological Register for January, 1846. From the Surveyor General's Office.
2. The Calcutta Christian Observer, for March, 1846.—By the Editors.
3. The Oriental Christian Spectator, for February, 1846. By the Editor.
4. London, Edinburgh and Dublin Philosophical Magazine, No. 179, for September, 1845.—By the Editor.
5. Zeitschrift für den Kunde des Morgenlandes herausgegeben Von Christian Lassen, Fünften Bundes Zweites Heft, 1844.—By the Author.
6. Atlas of Anatomical Plates, Fasciculus I. containing the Bones.—By F. J. Mouat, M. D.
7. Astronomical Observations made at the Royal Observatory, Cape of Good-Hope, 1834, under the direction of F. Maclear, Esq. : F. R. S. R. A. S., &c. &c., Her Majesty's Astronomer, vol. 1st.—By the Royal Society.
8. Proceedings of the Zoological Society of London, part 12, 1844.—By the Society.
9. Tareek Eausafee, by Esuf Khan Hydrabadee.—By the Author.

PURCHASED.

10. Wilkinson's Manners and Customs of the Ancient Egyptians, 5 vols.
11. Plates to Wilkinson's Ancient Egyptians.
12. Journal des Savans for October, 1845.
13. Annals and Magazine of Natural History, vol. 16, No. 107, for Dec. 1845.
14. Gould's Australian Birds, part XX.
15. Sanghita, 18 numbers.
16. Edinburgh Review, Nos. 161 and 162.

EXCHANGED.

17. Journal Asiatique, vol. 5, No. 24, June, 1845.
18. The Athenæum, No. 946 to 948, for December, 1845.

Read the report of the Committee of Papers upon the questions which have occupied its attention as regards the employment of a salaried Sub-Secretary; it appearing that the funds of the Society do not permit of the maintenance of this officer, the Committee recommended that, much as it regretted the necessity which the proposed arrangement included of depriving the Society of the services of Dr. Roer, it was obliged to suggest a re-arrangement of the Secretary's establishment, whereby an individual, in a position to devote the whole of his time to the duties of Librarian, and capable at the same time of acting as assistant to the Secretary might be engaged. The Committee, therefore,

suggested that funds not being available, the office of Sub-Secretary should cease to exist, and that arrangements should be adopted by the appointment, experimentally, of Baboo Kissory Chand Mitter, as Librarian and Assistant-Secretary. It was resolved that letters should be addressed to Mr. Piddington and Dr. Roer accordingly, and that the native gentleman above-named should be appointed to the offices indicated on a salary of eighty Rupees a month, for six months, with an assistant at forty Rupees. The salary of Babu Kissory Chand Mitter to be increased to 100 Rupees at the end of that period, if the arrangement be found to prove satisfactory. The question was put to the vote and carried by a majority.

It was then proposed by Dr. Hæberlin, and carried by acclamation:—

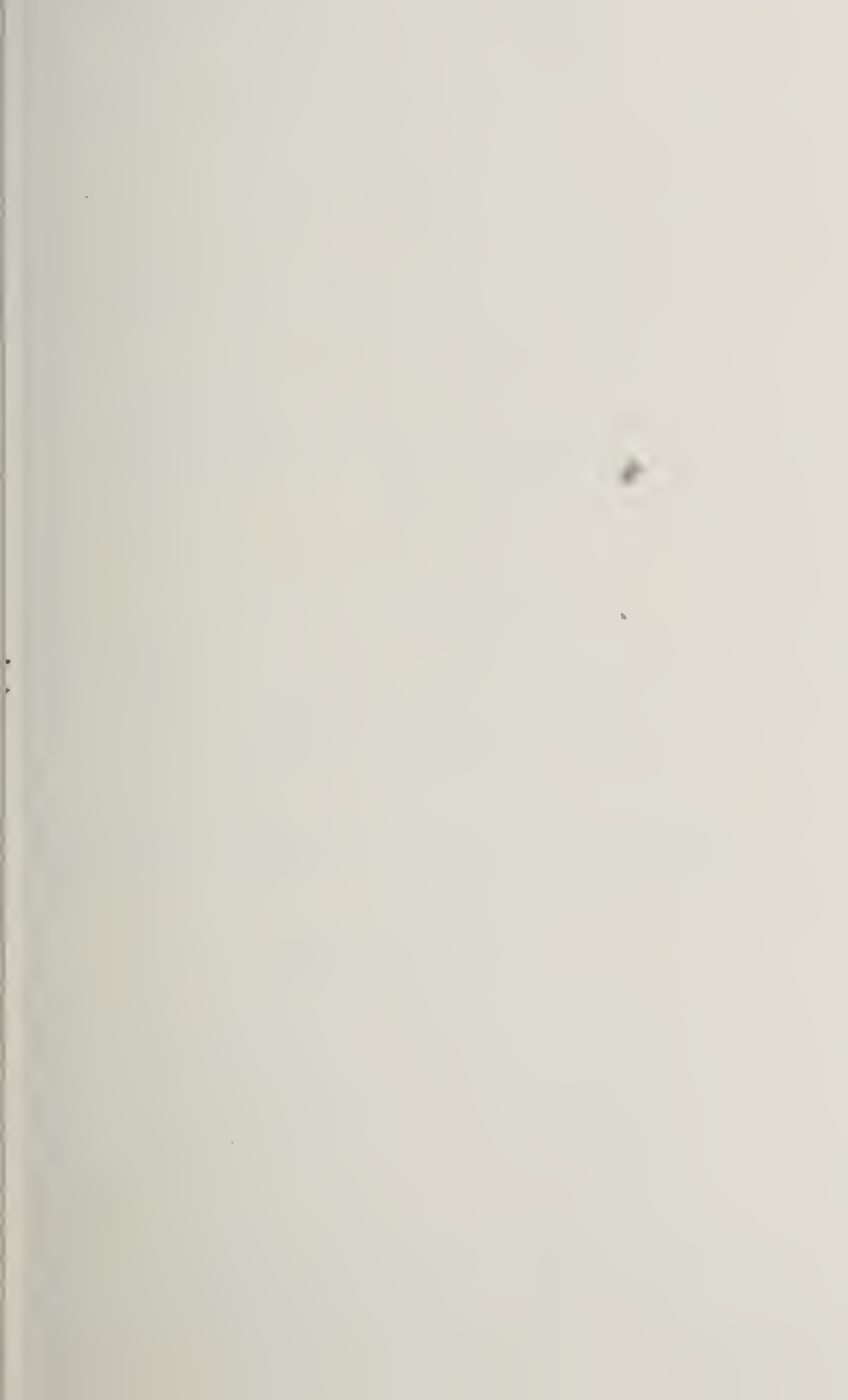
That the Society offer to Dr. Roer, the expression of its regrets at losing the advantage of his services as Librarian, and apprise him that he has been elected an Associate Member of the Society.

It was proposed by Dr. Hæberlin, seconded by the Secretary, and carried by acclamation:—

That the thanks of the Society be voted to Mr. Piddington for the valuable and constant assistance which he has afforded to the Society and the zealous manner in which his services have been invariably devoted to it.

The accounts of the Society having been laid upon the table by the Secretary for the inspection of the members, it was resolved that C. K. Robison, Esq., Capt. Marshall, the Rev. J. Macqueen, and J. Ward, Esq., be requested to form a Committee of Audit.

For all presentations, the thanks of the Society were accorded.





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